HSBC Climate Change

HSBC Global Research

Climate Change
May 2009

Building a green recovery

Governments allocate USD470bn – and counting….

As governments struggle to confront the deepening recession, they are allocating increasing amounts of their fiscal stimulus plans to the growing 'climate economy'. Since the beginning of the year, the 'green stimulus' has grown from USD430 to over USD470 billion, with China and the USA in the vanguard, driving investment in critical infrastructure such as rail, grids, water, buildings and renewables.

Following the G-20 summit in April, this report consolidates and updates the work of HSBC's Climate Change Centre of Excellence on climate change and the economic crisis. We believe that the first phase of the 'green stimulus' story has come to an end, with attention now focusing on when the stimulus will arrive and whether it will be effective in building a low carbon recovery. We expect a further installment in the run-up of the Copenhagen climate negotiations in December.

By Nick Robins, Robert Clover and Charanjit Singh

Disclosures and Disclaimer This report must be read with the disclosures and analyst certifications in the Disclosure appendix, and with the Disclaimer, which forms part of it

HSBC

Summary

- Around the world, governments have allocated more than USD470bn in fiscal stimulus to climate change investment themes, leveraging a total of over USD980bn
- China and the US lead the way, and 'green infrastructure' is the major beneficiary, particularly rail, grids, water and buildings
- Finally, signs of stimulus impact are starting to emerge, notably in China and the USA, and we expect a second instalment to emerge in the run-up to the Copenhagen climate talks

Money on the table

Governments are facing the triple effects of economic downturn, energy security and climate change. Across the world, they are responding by allocating a sizeable proportion of their fiscal stimulus packages to investments consistent with a low-carbon economy.

A climate of recovery? The climate change investment dimension of economic stimulus plans

					Low carbon power		Energy efficiency (EE)				
Region/country	Fund USDbn	Period years	Green Fund USDbn	% Green Fund	Renewable	CCS/other	Building EE	Lo C Vech+	Rail	Grid	Water/waste
Asia Pacific											
Australia	26.7	2009-2012	2.5	9.3%	-	-	2.48	-	-	-	-
	17.1	2009-2013	6.8	39.8%	1.40	1.77	0.17	-	3.46	-	-
China (NDRC Stimulus)	586.1	2009-2010	200.8	34.3%	-	-	-	1.50	98.65	70.00	30.69
China (Budget 2009)	61.4	2009	15.6	25.4%	-	-	-	-	4.95	-	10.63
Indonesia	5.9	2009	0.1	1.6%	0.07	-	-	-	0.03	-	-
Japan (Stimulus 2008)	485.9	2009 onwards	12.4	2.6%	-	-	12.43	-	-	-	-
Japan (Stimulus 2009)	154.0	2009 onwards	23.6	15.3%	1.07	12.93	5.90	3.70	-	-	-
South Korea	38.1	2009-2012	30.7	80.5%	1.80	-	6.19	1.80	7.01	-	13.89
Saudi Arabia	126.8	2009	9.5	7.5%	-	-	-	-	-	-	9.45
*Sub-total Asia Pacific**	*1518.9*		*302.0*	*19.9%*	*4.3*	*14.7*	*27.2*	*7.0*	*114.1*	*70.0*	*64.7*
South Africa	7.5	2009-2011	0.8	9.4%	0.0	0.0	0.1	0.0	0.6	0.0	0.1
Europe											
European Union**	38.8	2009-2010	24.7	63.7%	0.65	12.49	2.85	1.94	-	4.85	-
Germany	104.8	2009-2010	13.8	13.2%	-	-	10.39	0.69	2.75	-	-
France	33.7	2009-2010	7.1	21.2%	0.87	-	0.83	-	1.31	4.13	-
Italy	103.5	2009 onwards	1.3	1.3%	-	-	-	-	1.32	-	-
Spain (recent)	14.2	2009	0.8	5.8%	-	-	-	-	-	-	0.83
United Kingdom	34.9	2009-2011	3.7	10.6%	0.10	0.64	0.79	1.72	0.41	-	0.05
Other EU States	207.1	2009-2010	1.9	0.9%	0.8	-	0.6	0.3	-	-	0.1
Sub-total EU	*537.0*		*53.4*	*9.9%*	*2.4*	*13.1*	*15.5*	*6.6*	*5.8*	*9.0*	*1.0*
Norway	2.9	2009	0.9	29.7%	0.2	0.0	0.2	0.0	0.3	0.0	0.2
Sub-total Europe	*539.9*		*54.3*	*10.1%*	*2.5*	*13.1*	*15.7*	*6.6*	*6.1*	*9.0*	*1.2*
Americas											
Canada	31.8	2009-2013	2.6	8.3%	-	1.08	0.24	-	0.39	0.79	0.27
Mexico	7.7	2009	0.8	9.7%	-	-	0.75	-	-	-	-
US EESA***	185.0	10 Years	18.2	9.8%	10.25	2.60	3.34	0.76	0.33	0.92	0.52
US ARRA	787.0	10 Years	94.1	12.0%	22.53	3.95	27.40	4.00	9.59	11.00	15.58
US Budget 2010#	4.9	2010	4.9	-	-	-	-	-	1.00	-	3.90
Sub-total Americas##	*1024.1*		*121.2*	*11.8%*	*32.8*	*7.6*	*31.7*	*4.8*	*11.3*	*12.7*	*20.3*
Grand total	**3090**		**478**	**15.5%**	**39.7**	**35.5**	**74.6**	**18.4**	**132.1**	**91.7**	**86.3**

*Includes Thailand and India; ** Only EUR30bn from direct EU contribution considered; *** USD700bn under TARP for bank bailouts not considered; # Includes only additional spending in Green sector under focus; ## Includes Argentina and Chile stimulus; +Low carbon vehicles
Source: Countries, HSBC

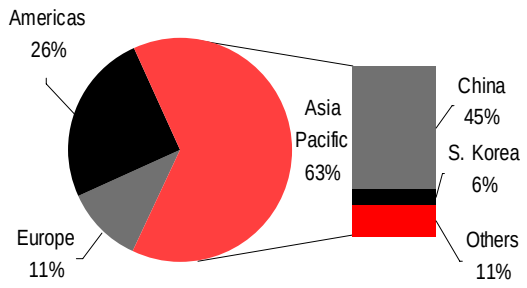
In this report, we consolidate and update the analysis the HSBC Climate Change Centre of Excellence has been conducting in recent months on the economic crisis and climate change. From USD430bn at the beginning of the year, we estimate that well over USD470bn out of nearly USD3.1trn in tax cuts, credits and extra spending can now be categorised as "green", or approximately 15%.

Even with is massive injection of fiscal stimulus into the system, the pace of decline in industrial production is on a par with the early months of the Great Depression. Our forecasts reflect this ongoing weakness. For the global economy in 2009, HSBC recently lowered its GDP forecast from -1.4% to -1.9%. For the developed world, we now expect 3.0% shrinkage compared with a fall of 2.5% previously. The emerging world is still expected to expand, but at a paltry rate of 1.7% on the back of growth signs in China as the stimulus starts to trickle down.

China and the USA in the lead

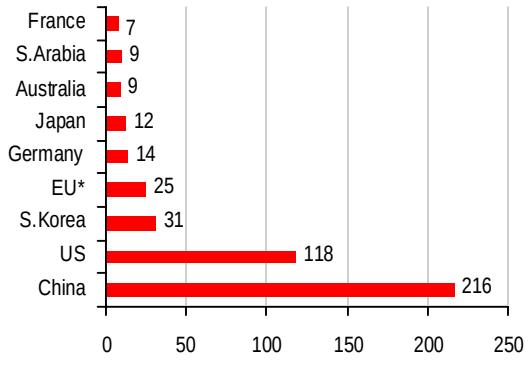
China and the USA dominate the landscape in terms of both the size of their overall stimulus plans, as well as the extent of the green dimension. With sizeable financial reserves and a tradition of long-term planning, in November 2008, China launched its RMB4,010bn (USD584bn) package. Almost 40% of this is allocated to "green" themes, most notably rail, grids and water infrastructure, along with dedicated spending on environmental improvement. Elsewhere in Asia, South Korea has introduced a dedicated Green New Deal, with more than 80% allocated to environmental themes.

Who stands where - Green Stimulus (USD478bn)



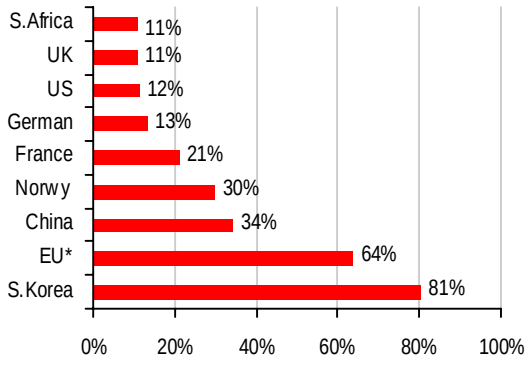
Source: HSBC

Green stimulus regional ranking (USDbn)



Source: HSBC (*Only central EU recovery plan)

Green stimulus regional ranking as a % of total stimulus

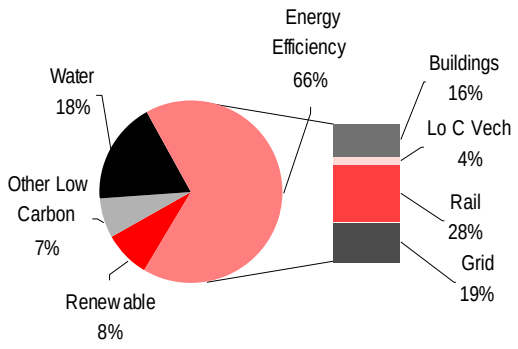


Source: HSBC (*Only central EU recovery plan)

The Asia-Pacific region has the largest green stimulus packages in both percentage (close to 20%) and in absolute terms (cUSD295bn). As expected, the massive stimulus package offered by China represents c50% of the total.

The new American Recovery and Reinvestment Plan commits USD787bn to kick-starting the economy, with USD94bn for renewables, building efficiency, low-carbon vehicles, mass transit, grids and water. Although the green component is smaller than China's, it is more broadly based, and the only plan with a real boost to renewables. The existence of substantial automatic fiscal stabilisers in Europe has meant that the EU stimulus is so far smaller in size.

Green stimulus theme allocation (USD478bn)



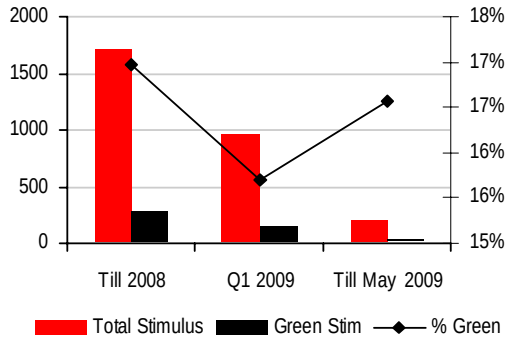
Source: HSBC

Boosting green infrastructure

Laying the foundations to underpin future growth is a core element of most stimulus plans, and the bulk of climate dimension is allocated to a suite of green infrastructure options, notably rail, grids, water and buildings.

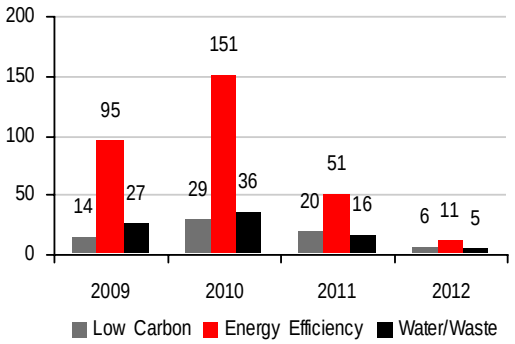
Low carbon power receives around 15% of the total, with renewables at 8%, and carbon capture and storage accounting for the balance; only one country – Canada – has allocated spending to the nuclear sectors as part of its stimulus efforts. Overall, construction and capital goods sectors are likely to be the major beneficiaries, along with an indirect effect for power, rail and water utilities.

Green stimulus commitment trend (USDbn)



Source: HSBC (Other small EU states not included)

Estimated timing by theme (USDbn)



Source: HSBC

HSBC

Timing the delivery

We expect the impact to be muted in the first half of 2009 – except in China – with a pickup in the second half. As a result, we estimate that three-quarters of green stimulus spending will be disbursed in 2009 and 2010, with the bulk impacting the economy in 2010. However, this timetable could slip in the implementation phase.

We have also observed that the total amount of stimulus spending has slowed as we approach the end of the first half of 2009. But the green proportion has recovered after a dip in Q1 2009.

Multiplying the impact

Typically, the range of multipliers for government spending varies from less than one to more than four, depending on economic assumptions, the type of fiscal policy and the country concerned. Multipliers also depend on country circumstances, including type of instruments used, trade openness, borrowing constraints, the response of monetary policy and long-term sustainability.

We have used these estimates from the IMF to analyse the green stimulus, and assumed an average multiplier of just over 1 for the total green component of the global stimulus package, leading to USD510bn in spending in the next two years, resulting in a total level of spending of some USD988bn.

Multiplier effects of fiscal stimulus

Measures	Range	
	Lower	Upper
Tax cuts	0.3	0.6
Infrastructure investment	0.5	1.8
Other*	0.3	1

(* Transfers to state govt, assistance to small and medium sized enterprises and housing markets)
Source: IMF 2009, Group of Twenty Meeting of the Deputies Feb 2009;

Starting to stimulate

Signs are emerging that stimulus packages announced last year, especially from China, have started to have a material economic and industrial impact. In China, infrastructure investment surged by 70-120% y-o-y and credit growth rebounded to a 10-year high of over 30% y-o-y in March 2009. Another sign of the stimulus helping recovery is the improvement in industrial production, which averaged 5.2% y-o-y in the Jan-Feb period (11% y-o-y in February) – only marginally lower than the 5.7% y-o-y in last December.

In the USA, 'green stimulus' funds under the American Recovery and Reinvestment Act (ARRA) have also started to flow. According to the US Department of Energy, recent allocations include USD41.9m to accelerate the commercialization of fuel cells and more than USD3.3bn towards smart-grid technology development grants, with an additional USD615m for smart-grid storage, monitoring and technology viability.[1] This represents just c10% of the money to be deployed in 2009/2010 under the ARRA. However, unlike in China, these announcements have yet to have a macroeconomic effect.

[1] *http://www.energy.gov/news2009/7262.htm; http://www.energy.gov/recovery/documents/DOE_Major_Communications_04172009.xls*

Following the G-20 summit in April, Japan, UK and Australia strengthened their 'green stimulus' plans. We believe the first phase of linking economic recovery with climate has now ended, with the second phase starting in the run up to the Copenhagen climate talks in December.

Note: In the analysis that follows, we draw on the latest economic forecasts published by HSBC on 1 April 2009. We also provide a climate change profile for each country. Emission data for industrialised countries is cited in GHG terms (mtCO2e) controlled under the Kyoto Protocol, whilst for emerging economies we quote only emissions of carbon dioxide primarily from energy and cement manufacturing (mtCO2).

HSBC

Contents

Summary 1
Money on the table 1
China and the USA in the lead 2
Boosting green infrastructure 3
Timing the delivery 4
Multiplying the impact 4
Starting to stimulate 4

The green deal gets real 7
From margin to mainstream 7
Targeted, timely, temporary… 8
…and transformative 8
Climate categorisation 10
Five questions for green deals 11

Regional Analysis 13
Australia 14
China 16
Japan 19
South Korea 21
Saudi Arabia 24
South Africa 25
European Union 26
Germany 29
France 31
Italy 33
United Kingdom 34
Other Europe: Norway 36
Europe: summary 38
Canada 39
Mexico 41
USA 42
Other G2O 47
India 47
Brazil, Russia and Turkey 47

Theme analysis 49
Allocating the stimulus 50
Low-carbon power 51
Renewables 51
CCS and others 51
Energy efficiency 51
Water, waste and pollution control 52

A Copenhagen stimulus? 53
London's pale green G20 53
Will Copenhagen seal the deal? 53

Disclosure appendix 58
Disclaimer 59

We gratefully acknowledge the assistance of D Saravanan, S Goel and R Chaturvedi from the HSBC Climate Change Centre of Excellence in the preparation of this report.

HSBC

The green deal gets real

- Policymakers are increasingly favouring a strong climate component in economic recovery plans
- This could help frontload the investment required to slow, stabilise and then reduce greenhouse gas emissions
- Questions remain over size, timing, environmental effectiveness, job creation potential and multiplier effects

From margin to mainstream

Over the past six months, the deepening global economic downturn has propelled ideas that were once on the margins of economic policy into the heart of decision-making: bank nationalisation, quantitative easing and, the focus of this report, low-carbon recovery. In July 2008, a group of far-sighted pioneers in the UK proposed a "Green New Deal" as a way of reviving demand, creating jobs and accelerating the transition to an economy consistent with the need to dramatically reduce greenhouse gas (GHGs) emissions over the coming decades[2].

Advocates of a low-carbon stimulus now exist at the highest levels in government and business across the globe. The reasons for this shift are five-fold:

- Policymakers realise that there are powerful symmetries between the systemic failures of risk management that have led to the current financial crisis and those that threaten dangerous climate change if GHG emissions are left unchecked.
- The recent sharp rise in energy prices – and their subsequent collapse – has provided a strategic warning of the importance of reinforcing energy security, notably through a substantial improvement in the efficiency with which energy is used in homes, businesses and transport, and through the mobilisation of free, inexhaustible renewable energy resources.
- The low-carbon economy can also be a job-rich economy at a time of soaring unemployment, particularly through enhancing building efficiency, either via retrofit or new construction, and improving mass transit.
- There is growing acceptance that the next wave of productivity and innovation could well come from smart technologies that enable a growing world economy to thrive in the context of deepening carbon as well as other natural resource constraints, most notably water.
- There is the importance of protecting the climate itself, which all major world leaders accept as a global imperative. The science is

[2] *New Economics Foundation, A Green New Deal, July 2008*

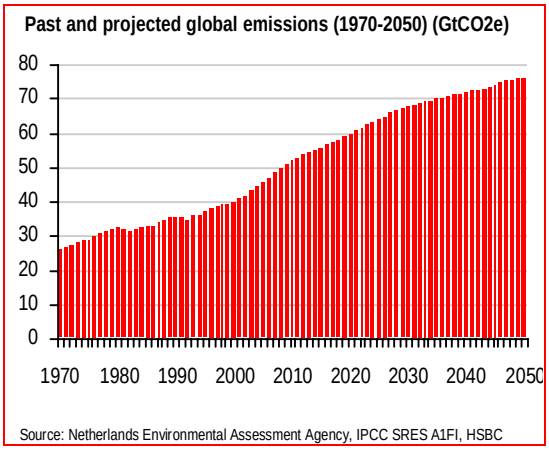
secure, impacts are already present and negotiations are underway for a new global climate treaty, scheduled to be completed this December in Copenhagen.

This agenda is by no means uncontested. Commercial and political concerns that environmental action in a recession is an unaffordable luxury certainly remain. Indeed, the European Union's Climate Package was the target of a sustained assault to reduce the cost of carbon curbs in December 2008. Yet, in spite of pressures to water down its climate commitments, the package came through largely intact. What has changed is the content of the climate investment narrative, moving away from an emphasis on the costs of confronting global warming change to a focus on clean-growth opportunities.

Targeted, timely, temporary…

Governments are currently preoccupied with confronting the twin crises of financial collapse and economic slowdown, and are responding with interest rate cuts, bank rescue plans and an array of fiscal measures to get demand moving again. More than 20 governments have introduced emergency economic stimulus packages to cut taxes and increase spending. Most of these efforts are inward-looking, focusing on expanding the domestic economy. But there is growing awareness of the need for international coordination through the Group of 20 leading economies.

The International Monetary Fund has recommended that 'the optimal fiscal package should be timely, large, lasting, diversified, contingent, collective and sustainable'[3]. Others have shortened the list to a simpler trinity of 'targeted, timely and temporary' measures, highlighting the importance that government action should be seen as a passing phase in policy, which does not result in the build-up of unbearable levels of debt which would constrain medium-term prospects. When the IMF underscores the importance of the package being 'sustainable', it is not using the term in the environmental sense. Nevertheless, it does spotlight the value of 'a few high profile programmes, with a good long-run justification and strong externalities (for example, for environmental purposes) can also help, directly and through expectations'.



…and transformative

The long-run justification for determined action on climate change is clear. The globe's leading scientists concluded in 2007 that global GHGs – most notably carbon dioxide – would need to fall by 50-85% by 2050 from 1990 levels if the world was to stand a reasonable change of avoiding dangerous and irreversible impacts in the form of storms, floods, droughts, heat waves and sea-level rise[4].

The 2008 G-8 summit in Hokkaido committed the world's leading countries to hitting the lower end of this range. With Barack Obama now in the White House, the USA has pledged to cut its emissions by 80% by mid-century, reflecting the disproportionate share that the industrialised world must take as a result of their historic emissions and greater capacity to act.

[3] *Antonio Spilimbergo, Steve Symansky, Oliver Blanchard and Carlo Cottarelli, Fiscal Policy for the Crisis, IMF Staff Position Note, December 2008*

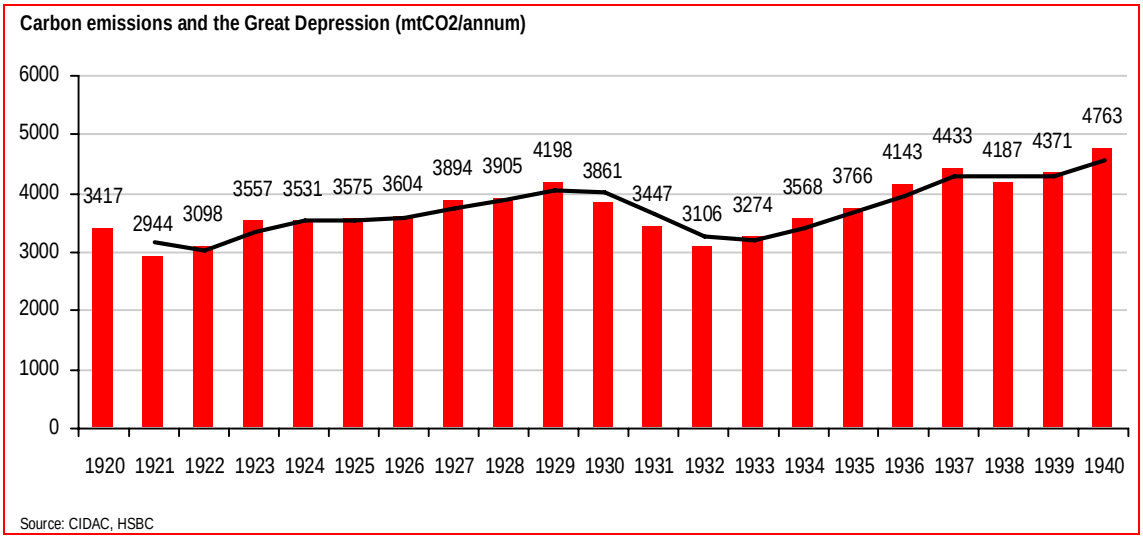
[4] *IPCC, FAR, 2007*

Hitting these targets is made all the more difficult by the fact that emissions of GHGs are heading in precisely the wrong direction. The UN Framework Convention on Climate Change (UNFCCC) was agreed in June 1992, and bolstered in 1997 with the Kyoto protocol, which set binding targets on the industrialised world to cut its emissions by 5% by 2008-12 from 1990 levels. But rather than stabilising and then falling, emissions have actually accelerated through a combination of a rapidly expanding world economy and increasing carbon intensity as coal plays an ever-larger role in the global energy mix, rising from 24% in 2002 to 29% in 2007.

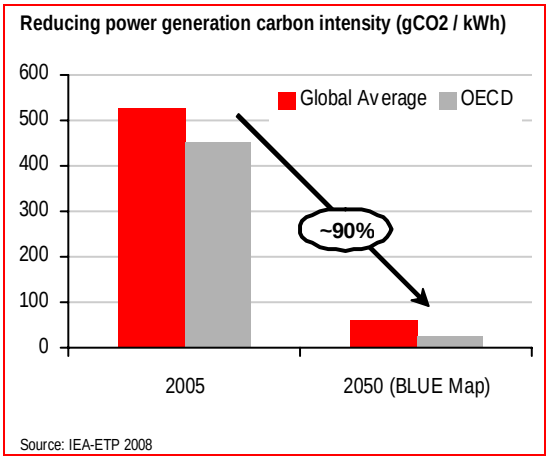
The economic downturn is certainly set to slow this growth in emissions in 2009 and 2010 – a reality reflected in the precipitous fall in the European carbon price from EUR21 in February 2008 to just EUR8.4 today. But as evidence from the Great Depression shows, emissions will rise once again when the economy recovers, unless structural action is taken in the meantime to change the content of growth.

Changing course on climate change will require a transformation in the global economy, a transformation that is certainly unprecedented but one that is both highly achievable and comes with a suite of spin-off benefits in terms of security, innovation and growth. The International Energy Agency (IEA) has concluded that an 'energy revolution' is needed to halve emissions by 2050 through a mix of measures that cut the energy intensity of growth as well as the carbon intensity of energy[5].

To take one example, in the global power generation sector, the average carbon intensity of energy needs to fall by nearly 90% by 2050 from the current c500gCO2/kWh to just c60gCO2/kWh. In the UK, which has recently committed itself to an 80% emission cut by 2050, the consequences are even more profound. By 2035, emissions from power generation will need to fall from 560gCO2/kWh to 52gCO2/kWh, requiring a substantial boost to renewable power and heat as well as the roll-out of pivotal technologies such as carbon capture and storage (CCS).



[5] *IEA, Energy Technology Perspectives, June 2008*



Globally, the IEA estimates that annual investments in clean energy systems for electric power, heat and cooling, industry and transport need to surge 18 times from current levels to an average of USD1.3trn between 2005 and 2050. IEA also estimates that these investments will yield net fuel savings over the same period of USD5trn. The fear of energy policymakers, however, is that the current slowing of capital investments risks an energy supply crunch when growth rebounds. IEA estimates that if growth is restored on its carbon-intensive *status quo ante* then emissions would resume their upward path, reaching levels 45% higher than in 2006 by 2030.

The timing of climate investments is just as important as their scale and allocation. Scientists at the IPCC have indicated that global emissions need to peak by 2015, making action in the next few years vital to change the emission trajectory. This is the focus of the forthcoming Copenhagen climate summit, which aims to achieve an international consensus on the actions over the medium term to 2020 and long term to 2050. Key elements of a global climate strategy include:

- An effective price on carbon, for example, through emission trading and green taxes.
- Incentives for the expansion of low-carbon energy power such as renewables and CCS.
- Tighter standards for the energy efficiency of buildings, vehicles and appliances.
- Preventive investments to adapt to the impacts of climate change, particularly in developing countries.
- Policies to expand natural carbon sinks as well as reduce emissions from deforestation and degradation (REDD), especially in the tropics.
- Scaled-up financial support for developing, transferring and deploying clean technologies in emerging economies.

The UN estimates that more than 80% of required investments will normally come from the private sector such as consumers and business[6]. However, in the extraordinary circumstances of the current crisis, a higher proportion could well come from the state. Allocating extra public spending to green recovery plans should not be seen as a substitute for taking tough decisions about strategic policy frameworks. But this extra public spending can play a critical function in first ensuring that the positive momentum in climate investments is not lost in the recession, and second in 'building the foundations for sound, sustainable and strong growth in the future'.[7] The result could be akin to killing a flock of birds with one or two stones.

Climate categorisation

In the pages that follow, we analyse the "green" or climate change components in the recovery plans of over 30 countries, including all the Group of 20 economies. To structure our analysis, we have used the 18 climate change investing themes identified by the HSBC Climate Change Index and classified relevant expenditures accordingly.

---

[6] *UNFCCC (2007), Investment and Financial Flows to Address Climate Change.*

[7] *Alex Bowen, Sam Fankhauser, Nicholas Stern and Dimitri Zenghelis, An outline of the case for a 'green stimulus', Grantham Institute on Climate Change and the Environment, February 2009.*

The HSBC Climate Change Index identifies four main clusters of investment opportunity:

- Low-carbon energy production, including renewable sources such as geothermal, hydro, wind and solar, along with nuclear power.
- Energy efficiency & energy management, including goods and services that enhance building, industrial and transport efficiency (such as fuel-efficient vehicles and modal shift) as well as energy storage.
- Water, waste and pollution control, including water conservation, treatment and supply.
- Carbon finance, most notably associated with carbon markets.

We have found considerable diversity in the plans that been issued to date. Many of the plans have crucial details over timing and allocation still to be finalised. We have therefore attempted to be conservative in our analysis, and have produced a set of estimates for the climate change dimension. We believe that these estimates will change as greater precision is given over the direction of the stimulus plans – and as the plans themselves are updated or superseded.

In our analysis, we have found a number of areas emerging as major beneficiaries. These include sub-themes such as rail infrastructure, which is part of the broader transport efficiency theme, as well as grid infrastructure, which is included in the Index's industrial efficiency theme. We have also identified areas of spending currently outside the Index, most significantly around carbon capture and storage (CCS). CCS is clearly a potentially pivotal technology, but is currently not included in the Index as it is not investable – in other words it is not yet at commercial scale and therefore is not associated with sufficient revenue generation. Finally, we have found no fiscal allocations at present to carbon finance.

Five questions for green deals

Overall, more than USD470bn, or approximately 15% of the total stimulus package (USD3.1trn), is allocated to climate change investment themes. For business, investors and taxpayers, five key questions need to be asked about the relationship between the current crop of economic recovery plans and climate change, for which we only have preliminary answers at present:

- Are plans allocating enough resource to the green stimulus? There is no magic proportion that should be targeted to climate change. The Grantham Institute in the UK has suggested a 20% benchmark, resulting in a "ball-park" figure of USD400bn of extra public spending on "green measures" over the next year or so . A report commissioned for the UN Green Economy Initiative has proposed that the G-20 should spend 1% of GDP on reducing carbon recovery over the next two years, equivalent to USD460bn.[8] These numbers are also in line with recommendations of the IEA's *2008 World Energy Outlook*, which estimates that clean energy investments of USD465bn per year need to be made from 2010-30. In our analysis, we have only included fiscal measures rather than wider policy incentives for low carbon growth.
- When is the green stimulus likely to materialise? Much is made of the need to focus on "shovel-ready" projects in a stimulus plan, and for investors, asset valuations of potentially affected sectors will depend on the precise timing of these measures taking effect. One concern is that fine-sounding plans could fail to have the desired impact in the implementation phase. This makes it imperative that governments are crystal clear about the administration of delivery.

[8] *Edward Barbier, A Global Green New Deal, UNEP, February 2009*

- How green is the Green New Deal? At this stage, our assessment has focused on scoping out the many contours of the global green stimulus. However, there is no necessary reason why a policy that is badged green will necessarily result in progress towards a low-carbon economy. Indeed, there is a risk of "green camouflage" with extra subsidies being targeted to industrial favourites without any real pressure for carbon transformation. We have, for example, excluded 'cash for clunkers' automobile scrappage schemes from our analysis. Equally, it is important that climate factors are integrated throughout economic recovery plans to ensure that good "green" measures are not blotted out by carbon-intensive spending elsewhere.
- How many jobs will be created in the short and medium term? Money invested in clean energy is estimated to create twice as many jobs per dollar invested compared with traditional fossil fuel-based energy[9]. What is important here is not just the job creation potential of "green" public works projects, which by nature will come to an end, but the degree to which the stimulus actually builds the base for sustained employment in low-carbon industries in the upturn[10].
- How effective is the green stimulus at mobilising private investment? Estimates vary of multiplier effects of government expenditure in the wider economy. The IMF cites existing studies that suggest a range of fiscal multipliers from less than one to more than four, depending on assumptions, type of policy and country. Germany's first stimulus package, for example, includes generous amortisation rules for companies and incentives for climate-friendly home renovation. Together, these will cost EUR12bn over two years and are expected to trigger EUR50bn in private investment, according to the IMF, implying a multiplier effect of 4x. Our estimates suggest a multiplier of just over 1, yielding USD510bn in extra spending.

All five of these questions point to the need for the vast sums now being allocated to stimulus plans, green or otherwise, to be made to work hard for the economy, jobs and the environment. This is requires attention to detail as well as transparency – all of which is especially important as we believe that what has emerged to date is only the first instalment of plans for green economic stimulus through 2009 and 2010.

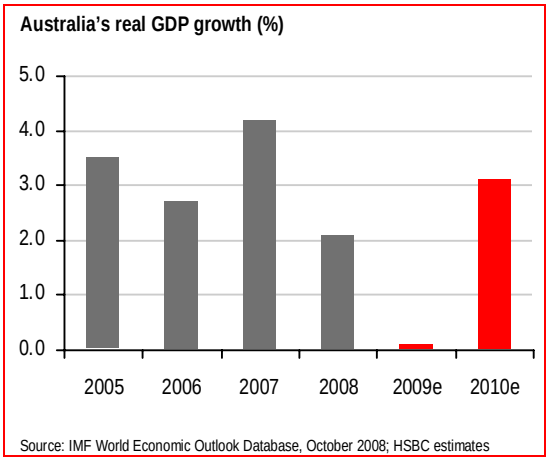
[9] *Center for American Progress, Green Recovery, September 2008*
[10] *UNEP, ILO, IOE, ITUC - Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*

Regional Analysis

Asia Pacific
Australia

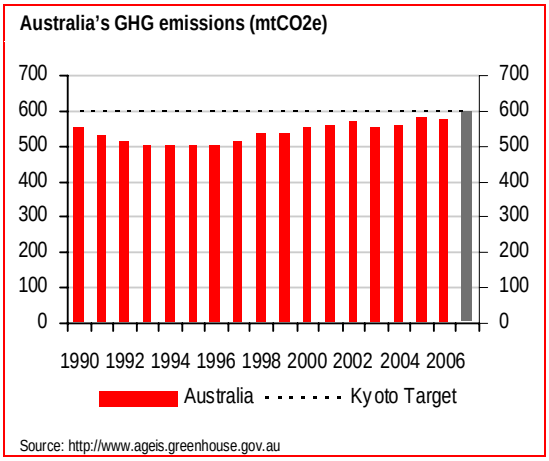
Economic backdrop

Australia's economy has slowed considerably with a fall of 0.5% in Q1 2009. We have recently revised down our 2009 year-average growth forecast to just above zero – not a bad outcome, given the dire global circumstances and expect a rebound in 2010.



Climate change profile

Australia has recently rejoined the international consensus on climate change. As part of the 1997 Kyoto Protocol, the Federal government successfully negotiated a 108% emission target from 1990 levels to 2008-12. However, Australia then refused to ratify the Protocol, a position that was reversed in December 2007 when the new Rudd Administration came into office. The lack of assertive policy frameworks over the past decade has meant that Australia's emissions grew by approximately 35% between 1990 and 2004 and are projected to rise 50% above 1990 levels by 2010[11]. Australia has now set itself a long-term target to reduce GHGs by 60% from 2000 levels by 2050, with a medium-term target to reduce emissions by between 5% and 15% below 2000 levels by the end of 2020.



In a dramatic shift in its climate policy, Australia has recently decided to delay its Carbon Pollution Reduction Scheme by 12 months to July 2012 citing the deepening global recession. The government is also planning to reduce the allowance price to A$10, much lower than the previous price of A$40. But the country's emission reduction targets were ramped up to 25% below 2000 levels by 2020 - up from 5-15% previously - *if* world leaders agree on an "ambitious" reduction goal in Copenhagen this December. The government will also increase the number of free permits allocated to industry under what it labels a global recession buffer.

The scheme will be Australia's primary policy tool to drive reductions in emissions of greenhouse gases[12]. The scheme will cover around 75% of Australia's emissions and involve mandatory obligations for around 1,000 entities. As part of the Mandatory Renewable Energy Target (MRET), Australia committed in 2007 to sourcing 20% of electricity supply from renewable energy by 2020.

Troubled stimulus

In February 2009, the Australian government unveiled its AUD42bn (USD27bn) Nation Building and Jobs Plan. Initially rejected in the Senate, the revised plan will create a cAUD22.5bn deficit in the year ending 30 June, the first

[11] *Australian Government, Analysis and recent trends of greenhouse indicators 1990-2004*

[12] *http://www.climatechange.gov.au/whitepaper/summary/index.html*

shortfall in seven years. The stimulus package plans to distribute AUD12.7bn in cash to families and low-income earners and spend AUD28.8bn on schools, roads, hospitals and energy efficiency. However, the package does not allocate spending to lower carbon power or water management

Energy efficiency

About 9% of the package is dedicated to building efficiency through the provision of free ceiling insulation to around 2.7 million Australian homes, cutting average fuel bills by AUD200 per year. In turn, this measure could cut GHGs by around 49.4tCO2e by 2020, equivalent to taking more than 1 million cars off the road[13].

Going green in the budget

In May, the government turned its Budget 2009-10 into a second stimulus package, investing AUD22bn with green and clean energy investments as the centrepiece. The budget contains Australia's largest post-war budget deficit, but must still be approved by Australia's Senate to take effect

Low carbon power

The budget allocates AUD4.5bn to a new Clean Energy Initiative which includes AUD1bn from existing funding. The initiative proposes to spend AUD1.5bn towards a flagship solar programme over the next six years to drive 1GW of additional solar generation. The budget also establishes a new body, Renewable Australia, with funding of AUD465mn over four years to promote new and existing renewable technologies. The solar credits scheme gets additional funding of AUD245mn, which enables individuals to claim AUD8000 per household for solar PV.

Carbon capture and storage also attracts attention in the budget, with AUD2bn earmarked for the CCS Flagship programme to develop industrial scale demonstration projects over the next nine years.

Although the carbon trading scheme has been postponed, the budget commits AUD16m over the coming four years to develop a National Carbon Accounting Toolbox.

Energy Efficiency

The budget provides an AUD100mn grant towards National Energy Efficiency Initiative for an energy network demonstration project to integrate a 'smart grid' with 'smart meters'.

Modal Shift

The budget invests a massive AUD4.6bn towards improving the metropolitan rail networks in six major cities: Adelaide, Brisbane, Melbourne, Perth, Sydney and the Gold Coast. These projects will modernise existing rail systems, enhance capacity and support fast low carbon transport systems.

The budget has gathered plaudits from industry bodies such as Clean Energy Council who have stated that the Government has delivered on climate change. The stimulus plan has also been welcomed by innovative coalition of environmental, business and labour groups that includes the Australian Institute of Superannuation Trustees, the Australian Green Infrastructure Council and the Property Council of Australia, along with the Australian Conservation Foundation and the Australian Council of Trade Unions. In a statement issued in December, the group highlighted, 'Super funds stand ready to partner with Government on this agenda, and can provide a significant contribution to the funding requirements around sustainable infrastructure'[14]. Following the government's package, the group has called for 'further green economic stimulus measures at a scale and scope that is comparable to the investments being made in both the USA and China.'[15]

---

[13] *http://www.treasurer.gov.au/DisplayDocs.aspx?doc=pressreleases/2009/008.htm*

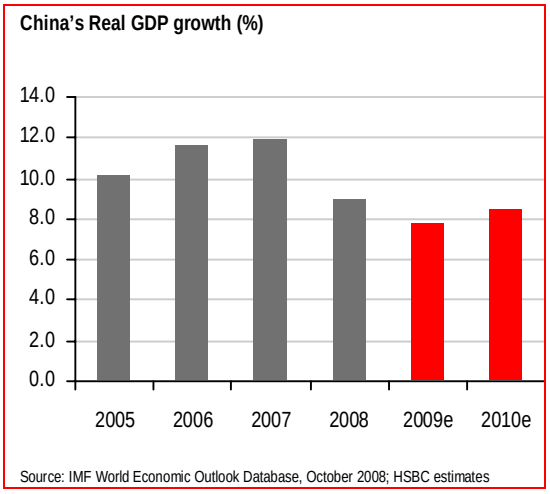
[14] *http://www.unep.org/greeneconomy/docs/Green_New_Deal_statement_20081202.pdf*

[15] *http://www.aist.asn.au/Pages/PolResAdv/SubPage_Media/documents/SCCCPlus_EconomicStimulus9Feb09.pdf*

China

Economic backdrop

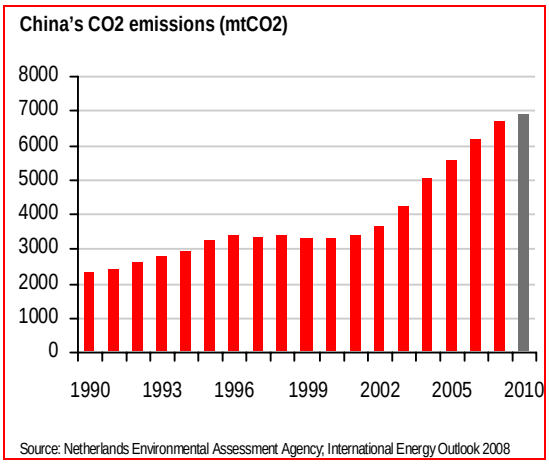
China's Q4 2008 GDP dropped sharply to a seven-year low of 6.8% y-o-y from 9% y-o-y in Q3 08. As the stimulus starts to filter through, we expect growth to slow moderately to 7.8% in 2009-the lowest in nine years-before bouncing back to around 9% growth in 2010.



Climate change profile

China has demonstrated a rapidly growing commitment to climate change. In 2007, it published its National Climate Change Programme (CNCCP), followed in October 2008 with its first White Paper. Improving energy efficiency remains at the core. The target within the current 11th Five Year Plan is to cut energy use per unit of GDP by 20% from 2005 levels by 2010. As per the US Energy Information Agency (EIA), China has already reduced energy intensity by 1.6% in 2006 and 3.7% in 2007 and EIA expects that the country will hit the 20% target on schedule. China is also expanding its renewable sector rapidly. In 2008, China doubled its installed wind capacity, making it the world's second-largest market for new wind installations after the USA. We expect China to be the world's biggest market for wind in 2009.

China's policy position rests on growing awareness of the country's vulnerability to the mounting impacts of global warming and the realisation that it has recently overtaken the USA as the world's largest emitter of greenhouse gases. Although China's contribution remains low by historical and per capita stands, its emissions' trajectory remains on an upward curve. The IEA estimates that China's energy-related CO2 emissions rose by more than 250% between 1990 and 2006 to 5.65GtCO2[16] and under the "business as usual" scenario the emissions may double again by 2030 to 11.71GtCO2, which would be twice the level of the USA.



China's emerging "high-growth, low-carbon" strategy is underscored by recent policy decisions:

- China lifted export tax rebates on labour-intensive and high-value-added products four times in H2 2008 but kept export rebates on energy-intensive and polluting products unchanged.
- China raised fuel consumption tax on gasoline five-fold to RMB1 from RMB0.2 per litre and the tax on diesel eight-fold to RMB0.8 from RMB0.1 per litre.

[16] *IEA, World Energy Outlook 2008*

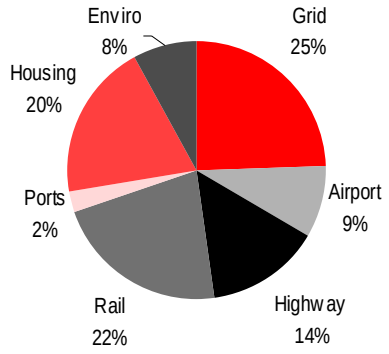
- China has initiated not just the largest stimulus package to date, but also the plan with the largest amount dedicated to climate change themes.

China's stimulus package

China's tradition of long-term planning enabled it to respond rapidly to the worsening economic climate by bringing forward construction work on planned projects. Launched on 9 November 2008, China's stimulus package of RMB4trn (USD586bn) over two years is equivalent to 13.4% of 2008e nominal GDP. Since then, provincial governments have been racing to produce their own investment plans that together total over RMB10trn. Not all of the planned investment will be new spending, with the government confirming that only RMB1.18trn will be new implying an annual stimulus of 2-4% of GDP in 2009 and 2010.

The plan is focused on boosting investment in railways, roads, public housing and rural infrastructure as well as environmental protection. Beijing also promised to increase subsidies for farmers and cut taxes. Winter is normally a slow season for construction and we expect the bulk of the new spending to filter through starting in Q2 2009. The priorities of the plan are also aligned to the long-term development of a low-carbon economy, most notably for rail.

Stimulus package breakdown (RMB4trn)



Source: HSBC, various ministry websites

Low-carbon power

Currently, there is limited visibility over how the plan will underpin further expansion of low-carbon power such as renewables. Industry sources expect the wind sector to 'nearly double again' in 2009, according to the Chinese Renewable Energy Industry Association[17].

Energy efficiency & energy management

- *Low-carbon vehicles:* Apart from the RMB4trn stimulus package, China also issued a plan for its auto sector in January 2009. This included a cut in the sales tax from 10 to 5% for cars with engines smaller than 1.6 litres. In addition, the package promises RMB10bn (USD1.5bn) in subsidies over the next three years for automakers to develop alternative-energy vehicles as Beijing wishes to promote the mass production of electric cars for urban areas.
- *Rail:* China is aiming to spend RMB1trn on expanding inter-province trunk railway lines. RMB50bn was spent in December 2008, with a target of completing RMB600bn of investments by the end of 2009. Between 2009 and 2010, the aim is to complete the construction of 16,000km of lines, covering mainly passenger services. This extra investment builds on the upward curve of rail investment from RMB252bn in 2007 to RMB350bn in 2008. Overall investment in railways by 2020 is set at RMB5trn, a big jump from the last target set in 2005 of only RMB1.5trn.
- *Grids:* More flexible and sophisticated grid infrastructure enables greater use of renewable energy sources and helps cuts transmission losses. China has committed RMB1.1trn to expand power lines and build out transmission over 2009-11, of which we expect RMB0.5trn in 2009-10.[18]

[17] *GWEC, US and China in race to the top of the global wind industry, 2 February 2009*
[18] *WRI, Green Lining China's Economic Stimulus Plans, 2008*

HSBC

Waste, water and pollution control

China had reduced the earlier stimulus allocation to environmental protection from RMB350bn to RMB210bn, diverting the planned investment to the housing sector. Though the broad investment contours are yet to emerge, China's Ministry of Environmental Protection has stated that the stimulus will 'not be spent in the energy and resource-intensive industries or high-pollution industries'. Improved sewage treatment is one of the focal areas of the ports and waterways component of the plan.

Two batches of central government stimulus funds worth RMB230bn have been released so by the end of January 2009. We estimate approximately 10% of the first and second batches will be spent on environmental projects. As the implementation of the plan develops, this could mean important allocations to renewables and energy saving in buildings.

China's 2009 budget also included some additional green spending. We estimate that RMB420bn of the RMB908bn public infrastructure spending announced would be additional to the stimulus package. We estimate that USD15.6bn of this would focus on rail infrastructure and water management.

Signs of recovery

Even by January, the signs were already emerging that the stimulus was starting to take effect. By March, infrastructure investment had surged by 70-120% y-o-y and credit growth rebounded to a 10-year high of over 30% y-o-y. Another sign of the stimulus helping recovery is the improvement in industrial production, which averaged 5.2% y-o-y in the Jan-Feb period (11% y-o-y in February) – only marginally lower than the 5.7% y-o-y in last December.

Looking forward, we believe that the potential for green innovation in China's economic stimulus package far exceeds what has been announced to date. For example, the RMB900bn allocated to low-income housing could be deployed in ways that conserve energy use, thereby contributing to the country's long-term energy efficiency goals.

Encouraging signs are emerging, with the Ministry of Environmental Protection announcing in January[19] that it has granted approval to 153 projects worth RMB470bn as part of the stimulus package, including water conservation. The national environmental watchdog has also rejected 11 energy-intensive and polluting projects worth RMB43.8bn. However, there is also likely to be pressure from many fronts to cast aside environmental controls, and there are reports[20] that environmental impact assessments in China are being hurried through.

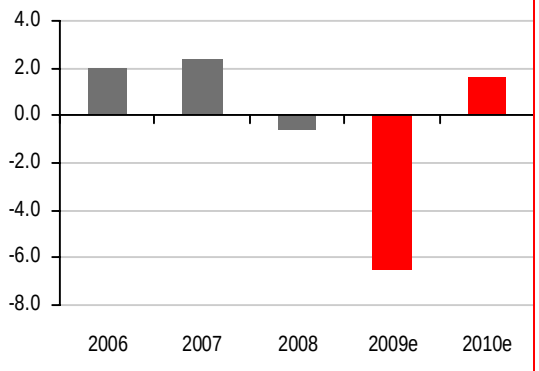
[19] *http://english.mep.gov.cn/News_service/media_news/200901/t20090112_133477.htm*
[20] *http://www.chinadialogue.net/article/show/single/en/2696-Sticking-to-a-truly-green-stimulus*

Japan

Economic backdrop

Japan's economy slowed dramatically with a double digit fall in Q4 2008 and Q1 2009. We expect growth to decline by 6.5% in 2009, before a modest recovery in 2010.

Japan's real GDP growth (%)



Source: IMF World Economic Outlook Database, October 2008; HSBC estimates

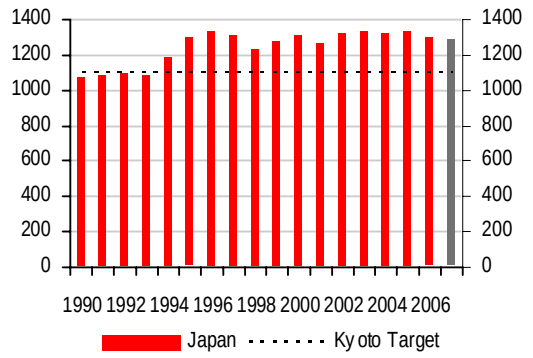
Climate change profile

Home to the Kyoto Protocol, Japan has historically had an energy-efficient and low-carbon economy. However, the country has found it difficult to curb its GHGs over the past decade. Recently, the extended shutdown of some nuclear plants meant that Japan's GHG emissions rose 2.3% to hit a record high in the year ending March 2008, 8.7% above the country's Kyoto base year.

In June 2008, Japan presented its proposals for a Low Carbon Economy, indicating a commitment to a global cap of 50% by 2050, with Japan itself reducing emissions by 60-80%. The country's climate advisory panel has recently published six scenarios for cutting GHGs in the medium term by 2020, with a final proposal expected in April.

Initially a pioneer on solar energy, new PV installations peaked in 2005, when subsidies were removed. The country remains committed, however, to a 10-fold expansion of solar PV by 2020 and a 40-fold expansion by 2030. In the

Japan's GHG emissions, 1990-2010 (MtCO2e)



Source: Green House Gas Emission in Japan, Kiko Network, May 2008, IEA 2008, HSBC

current financial year, the government has earmarked just JPY9bn (USD92m) for installing solar panels for households up to March 2009 and Japan's Ministry of Economy seeks to expand this cJPY24bn in FY2009.

Japan's 'low carbon revolution'

In December 2008, the Japanese government announced its JPY43trn (cUSD486bn) package of Measures to Support People's Daily Lives. The package focuses mainly on creating jobs and stabilising financial markets, with very limited stimulus for climate-related investments. Tax cuts of JPY1.1trn (USD12.2bn) include the immediate depreciation of investment in energy-saving and new energy equipment, but the actual proportion remains unclear[21].

On 11 April, Japan unveiled its second stimulus plan, worth JPY15.4trn (USD154bn). As with other countries, the second stimulus had a significantly higher 'green' content. The plan placed particular emphasis on its intention to promote a 'low carbon revolution', with over 15% of the new package, worth USD23.6bn, earmarked for climate-change-relevant themes.

[21] *http://www5.cao.go.jp/keizai1/2008/081224summary-english.pdf*

As expected, the plan allocated has significant spending towards solar and promoting energy efficiency (see .

Low Carbon power

Solar energy will be supported by grants for residences, schools and offices willing to install solar panels (USD1.1bn).

Energy Efficiency

Around USD3.7bn will be dedicated to 'eco-friendly cars' – offering rebates of USD4,000 for customers – followed by incentives for the purchase of 'eco-friendly consumer electronics', valued at USD2.9bn.

Other green measures include promotion of energy conservation in buildings (through better insulation), enhancing the use of wood biomass and recycling measures.

Modest emission cuts

Japanese officials estimate that these green measures will cut greenhouse gas emissions by around 2%. This is against a backdrop of a record output of GHGs last year, which rose 2.3%, taking the country 16% above its Kyoto Protocol target.

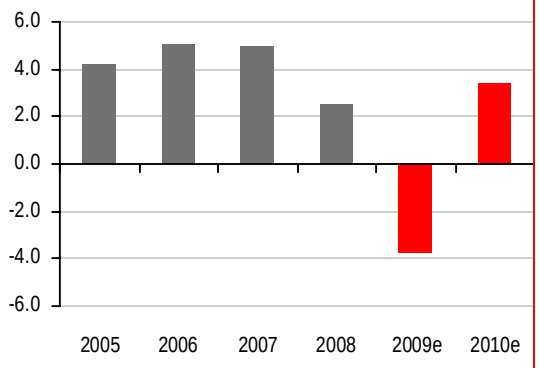
Taking the two packages together, Japan moves from a modest 2.6% 'green stimulus' to a more substantial 5.6%, or USD36bn.

South Korea

Economic backdrop

Korea suffered its second-biggest contraction on record in Q4 2008, pushing the economy towards its first recession since the Asian financial crisis. HSBC has cut its GDP growth forecasts to -3.7% from -3.2% for 2009, and expect only a gradual rebound to 3.4% growth in 2010.

South Korea's real GDP growth (%)

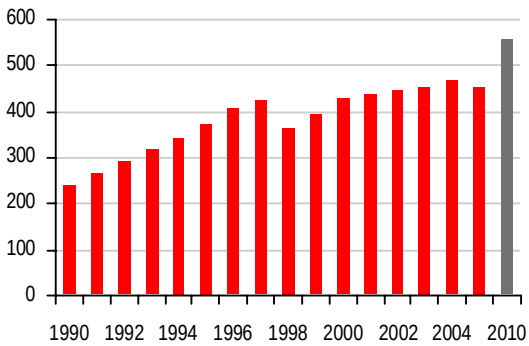


Source: IMF World Economic Outlook Database, October 2008; HSBC estimates

Climate change profile

South Korea is the world's 10th largest emitter of GHGs. But under the rules of the UNFCCC, it is still classified as a developing country and so does not yet have binding emission caps. Nonetheless, the Ministry of the Environment has tabled plans to cap emissions at 2005 levels over the first Kyoto period (2008-12). South Korea also piloted the world's first system for labelling carbon through the product lifecycle in 2008. The government is planning to pass a Climate Change Act this year which will include a plan for reducing emissions by 3.2% from 2005 levels by 2012. Korea also plans to announce a medium-term carbon target for 2020 this year.[22]

South Korea's CO2 emissions, 1990-2010 (mtCO2)



Source: CIDAC, IEA, HSBC

The government also plans to expand usage of renewable energy from 2.3% in 2006 to 5% in 2011 and 11% in 2030[23], which includes specific targets for various renewable energy technologies like solar, wind and biodiesel.

The greenest new deal?

On 19 January 2009, South Korea launched its Green New Job Creation Plan, a KRW50trn (USD36bn) package to be spent over the next four years. The plan essentially combines and streamlines a range of projects across different ministries, and aims to create 960,000 jobs, of which 149,000 jobs will be realised in 2009, mainly in construction. The plan has nine core projects organised in four main themes:

- Conservation: green cars, clean energy and recycling
- Quality of life: green neighbourhoods and housing
- Environmental protection: revitalising four major rivers and securing water resources
- Preparing for the future: IT infrastructure and green transport networks

22 *www.eng.me.go.kr/docs/news/hotissue/hotissue_view.html?seq=48*

23 *www.iea.org/textbase/pm/?mode=cc&id=4189&action=detail*

We estimate that more than 80% of the plan is allocated to climate-related investment themes.

We estimate, the proposed spending in 2009 (KRW6.2trn) under this Green New Deal would be would cost less than 1% of Korea's GDP in 2009 and the total stimulus is expected to cost c3.5% of 2009 GDP.

Low-carbon power

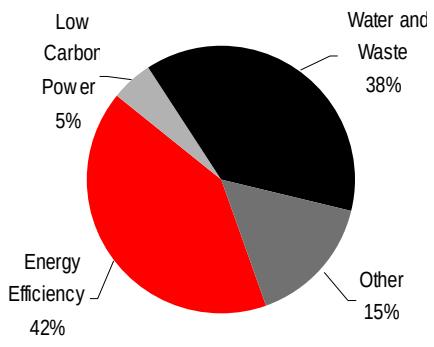
South Korea has committed to achieve 5% of energy from renewables by 2011. To move towards implementation, the government plans to spend USD1.8bn in the next four years. However, details of the projects or sectors in which the fund would be invested have not been revealed.

Energy efficiency

Energy efficiency clearly emerges as the winner in the South Korean Green New Deal.

- Building efficiency: the package allocates cUSD6bn for improving energy conservation in villages and schools and also in domestic households. The plan includes the construction of 2 million green homes and the installation of LED lighting in public facilities.
- Low-carbon vehicles: the package allocates cUSD1.8bn for fuel-efficient vehicles.

Breakdown of Korea's Green New Deal (USD36bn)



Source: HSBC, Ministry of Finance, South Korea - Jan 2009

- Modal shift: around USD7bn will be invested to promote low-carbon railways, as well as bicycle tracks and other public transport systems.

Water and waste water

River and forest restoration as well as the construction of medium-sized dams is a major component of the plan, amounting to USD14bn, or 38% of the total.

The government on 14 May 2009 unveiled its further plans to implement the Green New Deal saying that it would invest cKRW12.6trn (USD9.5bn) over next fiver years till 2013. The projects would include investment of cKRW4.2trn towards internet infrastructure; building efficient, low-carbon transit systems and establishing a low-

South Korea's Green New Deal

Project	Employment	USDm
Energy efficiency		
Energy conservation (villages and schools)	170,702	5,841
Fuel-efficient vehicles	9,348	1800
Environmentally friendly living space	10,789	351
Mass transit and railroads	138,067	7,005
EE – Sub-total	*328,906*	*14,997*
Low-carbon power (clean energy)	4674	1800
Water and waste management		
River restoration	199,960	10,505
Forest restoration	133,630	1,754
Water resource management (small and medium-sized dams)	16,132	684
Resource recycling (including fuel from waste)	16,196	675
National green information (GIS) infrastructure	3,120	270
Water sub-total	*369,038*	*13,888*
Total for the nine major projects	**702,618**	**30,685**
Total for the Green New Deal	**960,000**	**36,280**

Source: South Korea Ministry of Finance, HSBC

carbon work environment. The remaining c8.4 would be invested in R&D of 27 core green technologies, including high-efficiency solar batteries, LPG hybrid vehicles, highly efficient light emitting diodes (LED) and an advanced electricity metering system.

The South Korean government also expects these investments will create over 530,000 new jobs by 2013 and decrease Korea's carbon emissions by 1.8 million tons by that year[24].

Green shoots of recovery

The Green New Deal is a high-profile initiative, both domestically and internationally – with clear linkages being made with UN General Secretary Ban-ki Moon's own support for a global green stimulus. Surprisingly, South Korea's economy expanded by 0.1% in Q1 2009 giving signals that the 'green new deal' was starting to stimulate the economy. Other economic indicators are also painting a more positive picture: the PMI for May rose to a seven month high.

The green new deal of South Korea has attracted its fair share of criticism about the nature of the jobs that will be created, its financing and the potential negative environmental impacts of such large-scale construction, which the government has countered[25]. In addition to the Green New Deal, the South Korean government has also announced that it plans to establish a USD72.2m renewable energy fund to attract private investment in solar, wind and hydroelectric power projects.

---

24 *http://korea.net/news/news/newsView.asp?serial_no=20090514004*

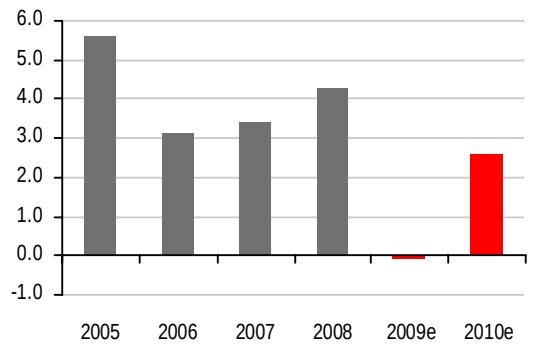
25 *http://english.mosf.go.kr/news/pressrelease_view.php?sect=news_press&sn=6170*

Saudi Arabia

Economic backdrop

We expect Saudi Arabia – like other regional oil producers – will enjoy some shelter from the global financial storm. We expect the economy to slow this year, with a modest 2.6% recovery in 2010.

Saudi Arabia's real GDP growth (%)



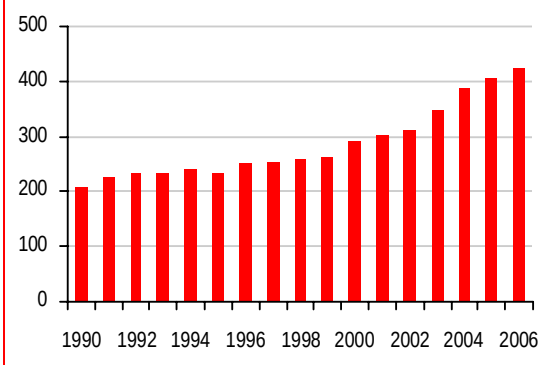
Source: IMF World Economic Outlook Database, HSBC estimates

Climate change profile

Saudi Arabia is one of the world's top 20 CO2 emitting countries in the world and emissions have doubled since 1990. Saudi Arabia has ratified the Kyoto protocol, but is concerned about the loss of oil sales as the world takes steps to curb emissions. Saudi Arabia estimates by 2010, the loss could be to the tune of cUSD19bn a year.

In its recent position paper to UNFCCC[26], Saudi Arabia stated its opposition to binding emission targets for developing nations and demanded special consideration for oil-producing nations. Saudi Arabia also expressed opposition to recent proposals calling for sectoral targets for developed nations, preferring instead that developed nations agree to economy-wide emissions targets. Saudi Arabia is starting to promote renewable energy - particularly solar power - but does not yet have specific targets[27].

Saudi Arabia's CO2 emissions, 1990-2006 (mtCO2)



Source: Energy Information Administration, IEA 2006

Green Lite budget

Saudi Arabia's 2009 budget, announced at the end of December 2008 aims to stimulate the Saudi's economy through an increase in public spending of 15.8% in spite of the sharp decline in oil prices.

Water and waste water

The only portions of the Saudi's stimulus that are relevant from a climate change perspective is the allocation of USD9.5bn towards water, agriculture, and infrastructure sectors. The water, sewage, and desalination projects garnered USD3.54bn and the remaining goes to water infrastructure development in the cities of Jubail and Yanbu and also for agricultural projects. More detail is needed to ascertain how this expenditure will promote water conservation and adaptation.

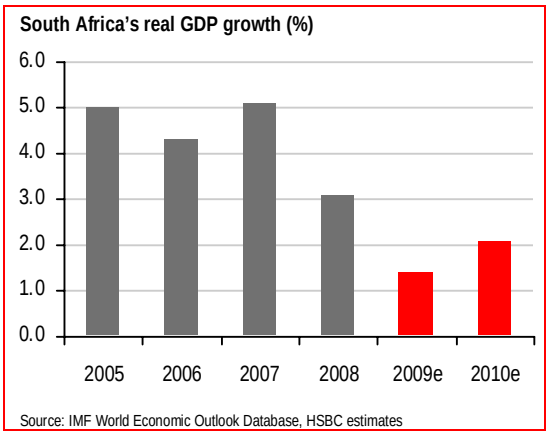
26 *http://www.ccap.org/docs/news/209/ClimateWire%20Saudi%20Arabia%20claims%204-22-09.pdf*

27 *http://www.planetark.com/enviro-news/item/52393*

South Africa

Economic backdrop

South Africa is, in many ways, well positioned to weather the current global economic storm as its banking system is relatively insulated and free of toxic-assets; exports also play a relatively limited role in the economy at below 30% of GDP. Nevertheless, the economy has slowed since 2007, contracting by -1.8% in Q4 2008, and is expected to fall further in the year ahead. We expect the GDP growth to touch a low of 1.4% in 2009, slowly recovering in 2010 by 2.1%.



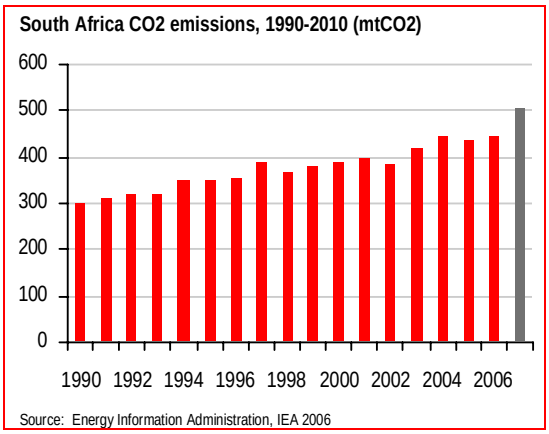
Climate change profile

South Africa depends on coal for 90% of its electricity needs, which is driving annual emissions of 450mtCO2, making the country the largest source of emissions in sub-Saharan Africa. However, the country is acutely aware of the risks of climate change, and in 2008, it announced its climate plan to stop the growth of its GHG emissions by 2020-2025 and begin to reduce its emissions thereafter.

The plan will reduce emissions through mandatory energy efficiency targets, new fuel efficiency standards for the transportation sector, an escalating CO2 tax, and a long-term goal of a net zero-carbon electricity sector. The plan is expected to led to a comprehensive regulatory scheme by 2012.

South Africa has also drawn up plans for its first CCS pilot plant, and is aiming to curb 5% of its emissions via CCS by 2020.

On the renewable energy front, the government has recently announced a 'feed in tariff' for wind, hydro, landfill power and concentrated solar power. The tariffs are significantly higher than a consultation paper issued in December with solar power getting the highest tariff of R2.1/kWh followed by wind R1.25/kWh.



Weathering the financial storm

South Africa has not announced a separate stimulus measure but included its recovery measures in the 2009 budget. The focus is on large infrastructure projects to be built over the next three years, including power stations, roads and railways, upgrading water and sanitation networks and providing more houses. The additional spending totals R78.5bn (USD7.5bn), over 2.5% of 2008 GDP.

Energy Efficiency

The budget improves the depreciation allowance for energy efficiency investments by an additional 15%. A further R1bn will be invested to improve electricity demand-side management,.

Modal shift: rail

Public and rail transportation will get R6.4bn for the development of the Rapid Rail Link Project and other public transport infrastructure.

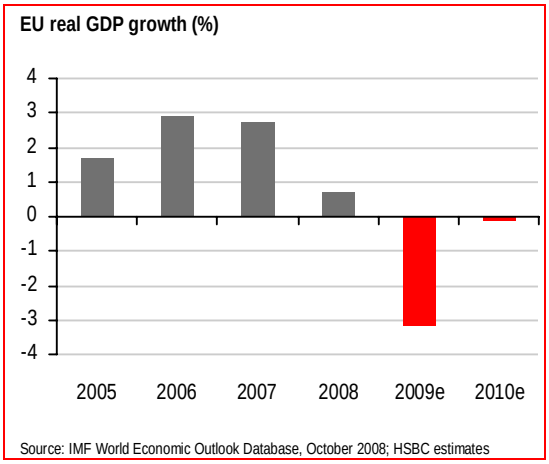
Water and waste water

Water and sanitation schemes will also be developed at the regional level with an investment of R1bn.

European Union

Economic backdrop

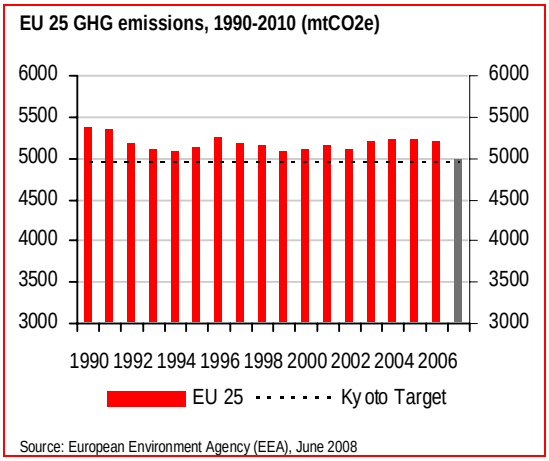
The EU economy entered recession in Q3 2008. HSBC expects the decline to continue in the first two quarters of 2009, pulling the annual GDP outturn to a negative 2.4% followed by a year of no growth in 2010.



Climate change profile

With agreement of its Climate Package in December, the EU has confirmed its position as a world leader in the drive to a low-carbon economy. The Union's 20:20:20 plan was confirmed, cutting GHGs by 20%, achieving 20% of primary energy from renewables and improving energy efficiency by 20%, all by 2020. The cap on carbon as part of the Emissions Trading System (ETS) will tighten by 1.7% a year from 2013, and 60% of allowances will be auctioned compared with just 3% in the current phase. Following heavy political pressure, major exemptions from auctioning were agreed for key industry sectors and power generation in Eastern Europe. The onset of the recession has, however, driven down the price of carbon in the EU ETS from EUR21 in February 2008 to EUR8.4 in February 2009. Carbon capture and storage also received a boost through the allocation of 300m extra allowances from the new entrants reserve. The challenge is now to translate the EU's high-level targets for renewables into real investment at the national level, which will invariably require a re-examination of permitting rules which slow the pace of development.

The EU's sustained focus on climate change paid dividends in the 1990s, with emissions falling from the 1990 level by 5% in 2006. European Environment Agency (EEA) estimates emissions to fall further to 8.5% by 2010, enabling the Union to meet its Kyoto target of an 8% reduction from the 1990 level by 2012.



The EU's Second Strategic Energy Review sets clear objectives for 2050 with a roadmap for nuclear power, cutting overall GHGs by 80%, improving energy efficiency by 35% and bringing the share of renewable energies in power generation to 60%.

The Commission is currently preparing its climate change policies for the period after 2012, with the focus on carbon capture and storage, inclusion of the transport sector into the ETS and adaptation policies. The Commission has also set out its initial ideas for a global climate agreement at Copenhagen, calling for industrialised countries to cut emissions by 20% by 2020 and 80% by 2050, matched by cuts in advanced developing countries of 15-30% below business-as- usual (BAU)levels by 2020.

Greening the recovery plan

In November 2008, the Commission tabled its European Economic Recovery Plan, proposing a comprehensive package of measures at the EU and national levels, amounting to EUR200bn or 1.5% of EU GDP. Most of the money – equivalent to EUR170bn or 1.2% of the EU's GDP – will be spent by the 27 Member States, with the balance of EUR30bn coming from the EU's own budget and the European Investment Bank (EIB). At their spring summit on 19-20 March, EU leaders finalised the European Recovery Plan, involving total funding of over EUR400bn (c3.3% of the EU's GDP). Automatic stabilisers such as unemployment and other welfare measures could take the overall fiscal stimulus to around 4% of GDP, spread over 2009 and 2010.

Low-carbon power

At the European level, the EIB will boost annual investments for energy and climate change-related infrastructure by up to EUR6bn per year for the next two years. A new 2020 Fund for Energy, Climate Change and Infrastructure will also be created, which would co-invest alongside institutional investors.

After the Spring Summit, the Council finally agreed the allocation of EUR3.9bn from the EU budget for energy infrastructure, including EUR1.75bn for gas and electricity interconnectors. We have counted towards the 'green stimulus' total EUR1bn for sustainable power generation from fossil fuels, involving 11 projects related to CCS. In addition, the plan allocatesEUR565m to offshore wind generation and grid connection.[28]

The European Wind Energy Association (EWEA) has stated that this subsidy will enable larger volumes of wind-generated electricity to be integrated quickly into the existing grid and provides new R&D opportunities to make the power sector more efficient and less expensive.

Energy efficiency

The plan calls for the 27 Member States to set demanding targets for energy efficiency in public buildings and make them subject to energy certification on a regular basis. To achieve this target, the plan proposes to introduce a reduced property tax for energy-efficient buildings and reduced VAT rates for green products and services, aimed at improving in particular the energy efficiency of buildings. Ultimate decisions on these proposals will, however, be taken at the national level.

The plan also proposes three priorities for clean tech innovation:

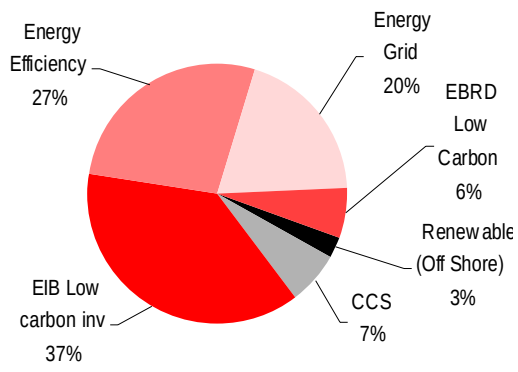
- A "European green cars initiative" to achieve a breakthrough in the use of renewable and non-polluting energy sources. The EIB and Member States would contribute together EUR5bn in research.
- A "European energy-efficient buildings" initiative to promote green technologies, valued at EUR1bn.
- A "factories of the future" initiative with a proposed EUR1.2bn.

Finally, the EBRD will double its efforts for energy efficiency, climate change mitigation and financing for municipalities and other infrastructure services, which could lead to the mobilisation of private sector financing to EUR5bn investments[29].

[28] *www.europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/36*

[29] *EU communication on European Recovery Plan, November 2008*

EU green stimulus breakdown (cEUR19bn)



Source: HSBC, European Recovery Plan

Assessing the precise allocation of EU spending to climate change themes is a complex business, not least because there is no clear timeline, and further detail is required on how the costs for many of the proposals will be split between the European and national levels. We have taken a conservative position, basing our assessment on the analysis conducted by the Brueghal Centre.[30] Our provisional estimate is that in 2009-10, there will be some EUR30bn in stimulus at the Union level, of which EUR19bn can be classified as "green", c64% of the total. We expect both the absolute amount and the share to rise.

In spite of the stimulus, the recent Renewable Energy progress report from the EU commission states that the measures will still not help the Union achieve its 2010 interim renewable targets. Only a 19% share of electricity is expected to come from renewable sources by 2010, against the 21% target.

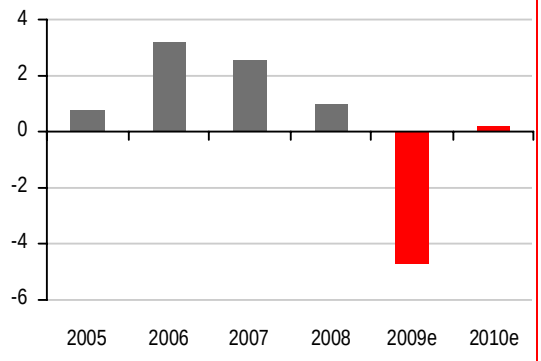
[30] *Brueghal, Estimating the size of the European stimulus packages for 2009, January 2009*

Germany

Economic backdrop

Europe's biggest economy, Germany, officially slipped into recession in the second half of 2008. HSBC estimates that German GDP will contract by 4.7% in 2009 and the growth rate is unlikely to be much above zero in 2010.

Germany's real GDP growth (%)



Source: IMF World Economic Outlook Database, October 2008; HSBC estimates

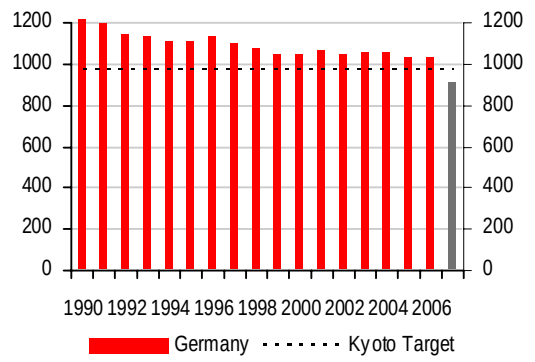
Climate change profile

Germany has set the pace in the drive to a low-carbon economy, with the largest share in the global market of environmental goods and services.

As part of the Kyoto Protocol, Germany adopted a stringent 21% cut in GHGs by 2012. Germany is on course to meet this target on the back of its "wall-fall" reduction in emissions, due to reunification and with its aggressive clean-energy and efficiency programmes. It is now aiming to cut emissions by 40% by 2020, with a view to an 80% cut by 2050.

Underpinning its climate strategy is a policy of Ecological Tax Reform (ETR) to shift the fiscal burden onto polluting activities. In addition, the country has been at the vanguard of renewable energy policy, based on generous feed-in tariffs. This has made Germany a world leader in both solar and wind installations, generating 250,000 jobs in renewable energy. In 2005, 6% of the country's primary energy was delivered from renewable sources, which needs to rise to 18% by 2020 as part of the EU Renewable Energy Directive.

Germany's GHG emissions, 1990-2010 (mtCO2e)



Source: European Environment Agency (EEA), June 2008

The twin stimulus package

Germany has announced two successive stimulus packages, the first in November 2008 and the other in January 2009. Together the stimulus amounts to EUR80bn, equivalent to 1.5% of GDP in 2009e and 2% of GDP in 2010e. The spending combines tax cuts with infrastructure investments, with a focus on climate protection and energy efficiency. To date, the stimulus measures have been silent on renewables, largely because the sector is already seen to benefit from favourable feed-in tariffs.

Energy efficiency

The stimulus gives energy efficiency a major thrust.

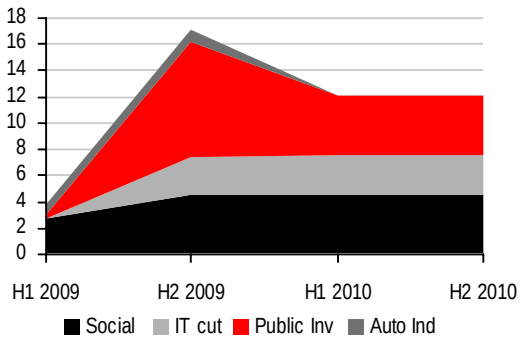
- *Building* efficiency: The package gives EUR3bn in subsidies for household repairs, especially for enhancing energy efficiency under the CO2 building renovation programme.
- Low-carbon vehicles: The package gives a "scrappage" bonus of EUR2,500 for replacing cars that are more than nine years old with new cars that meet EURO4 emission standards. To support the development of new low-carbon engines, the government will provide EUR0.5bn in loans over the next two

years. The government is also planning to introduce emission-based vehicle taxation from July 2009 for older vehicles and for new vehicles from 2013.

- *Modal shift*: The package will also invest EUR2bn in public transport systems over 2009 and 2010.

Germany's twin packages make up the biggest fiscal recovery programme in Europe, contributing at least 37% of the overall EU-27 stimulus. The government expects 70% of the stimulus to be disbursed before the first half of 2010. The onset of federal elections in September 2009 is also likely to be an additional incentive to disburse the package.

German stimulus package disbursement schedule (EURbn)



Source: http://www.bruegel.org/

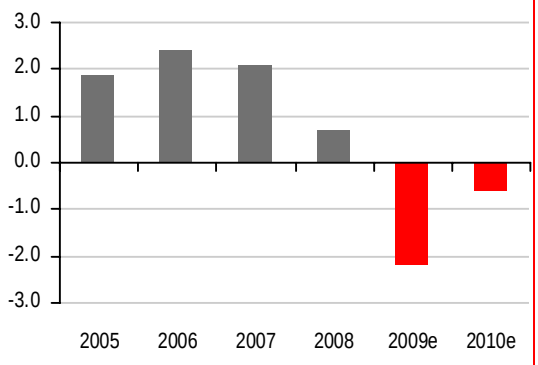
The government projects that these measures will trigger, directly and indirectly, additional investment and consumer spending of around EUR50bn over the next two years.

France

Economic backdrop

France narrowly escaped recession in 2008, but the economy is expected to shrink by -2.2% in 2009 and by around -0.5% 2010 by HSBC.

France's real GDP growth (%)



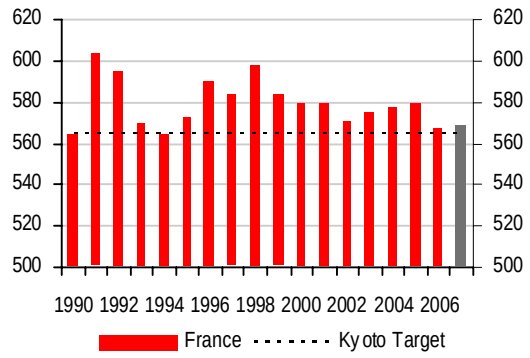
Source: IMF World Economic Outlook Database, October 2008; HSBC estimates

Climate change profile

With a large proportion of its electricity derived from nuclear power, France has the advantage of a low-carbon power base. However, the country is still expected to exceed its Kyoto GHG target by 10% in 2010, due to increasing emissions from buildings and transport[31].

As part of the ambitious *Grenelle de L'environnement* process, France has committed to a "factor four" reduction in GHGs by 2050. The country's Climate Plan, which has devised a set of measures in sectors like cars and housing, aims to save 54mtCO2e yearly by 2010. The plan includes a "bonus malus" tax system for CO2 emissions from cars. In terms of renewable energy, France has to double its renewable energy capacity from 10.3% in 2005 to 23% by 2020 under the EU Renewable Energy Directive.

France's GHG emissions, 1990-2010 (mtCO2e)



Source: European Environment Agency (EEA), June 2008

Revival plan

In December 2008, the French government announced its EUR26bn economic revival plan, costing the equivalent of 1.3% of gross GDP in 2009e. The package consists of:

- EUR11bn to boost business cash flows through the reimbursement of taxes.
- EUR11bn for direct state investment.
- EUR4bn from public companies to improve rail infrastructure, the postal service and energy services.

The package also included help for the ailing auto industry, with incentives to scrap older vehicles and buy new, more environmentally friendly models. The climate-relevant portions of the plan amount to more than 20%, the highest in the EU.

Low-carbon power

As part of the expansion of public sector investment, EDF will spend EUR300m on new renewables and a further EUR300m on hydro power. Apart from this, the government is also planning to spend EUR30m on sustainable agriculture and for the modernisation of farms, particularly to develop renewable energy.

[31] *http://www.minefe.gouv.fr/*

HSBC

Energy efficiency

Improving energy efficiency takes centre stage in the revitalisation plan.

- *Building efficiency*: EUR200m is being allocated to housing renovation in 2009 and 2010. In addition, public buildings like post offices will be upgraded at a cost of EUR600m, with EUR160m as additional funding to improve existing public structures. For new housing development in 2009-10, EUR1.5bn will be invested.
- Low-carbon vehicles: The package announced plans to promote low-carbon cars through a premium of EUR1,000 for vehicles emitting less than 160g of CO2. In total, EUR500m will be allocated to "scrappage" and the "bonus malus" scheme in 2009.
- Rail: To help shift travel away from carbon-intensive aviation, additional high-speed railway lines will be constructed at a cost of EUR0.95bn.

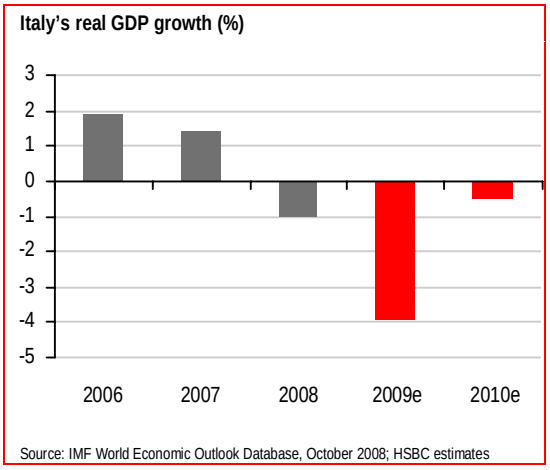
The package is projected to create 80,000-110,000 new jobs compared with a possible loss of some 90,000 jobs in 2009. This is based on the estimate that 75% of the EUR26bn package will be used in 2009. In February, the government announced that roughly EUR10bn out of the EUR26bn stimulus package will be immediately injected into 1,000 projects, mainly in infrastructure development such as railway networks and water management projects[32].

[32] *http://www.premier-ministre.gouv.fr/en/information/latest_news_97/stimulus_package_1_000_62594.html*

Italy

Economic backdrop

The Italian economy contracted in Q4 2008 and is expected to fall further this year and next.

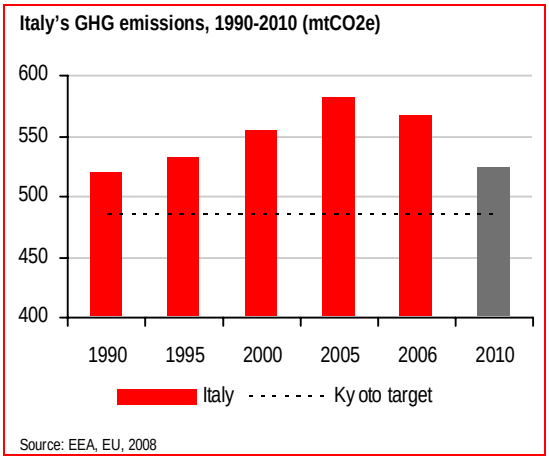


Climate change profile

Italy is set to breach its Kyoto target of cutting emissions by 6.5% by 2008-12. In 2006, Italy's emissions were 10% higher than the base-year of 1990. According EEA projections, even additional measures may not help the country hit the target. Italy does, however, have considerable renewable energy potential, particularly in terms of solar, where it has a high level of insulation and attractive feed-in tariffs. The government is targeting 3GWp in solar power by 2016. Last year, the country had 280MWp installed, with 150MWp installed in 2008 alone. The government aims to install a further 250MWp in 2009.

Emergency spending

Italy's EUR80bn Emergency Package announced on 28 November only contained around EUR5bn in new spending. To supplement this, the government launched a Car Stimulus Package, worth EUR2bn, in February, of which EUR1.3bn is directed at the promotion of more fuel-efficient vehicles.



Modal shift: rail

A fraction of the Emergency Package will underwrite bonds to finance rail investments of EUR0.96bn (USD1.03bn).

Low-carbon vehicles

The Car Stimulus Package includes a "scrappage" payment of up to EUR1,500 for trading in an old car to buy a new, more-efficient vehicle.

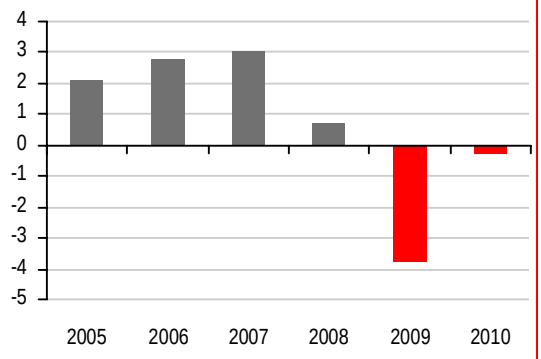
Italy's ability to stimulate the economy, green or otherwise, is hampered by a public debt of well over 100% of GDP.

United Kingdom

Economic backdrop

Growth in the UK fell to 0.7% in 2008 as the economy contracted in the second half. HSBC estimates that GDP will fall to -3.8% in 2009 and by a further -0.3% in 2010.

The UK's real GDP growth (%)



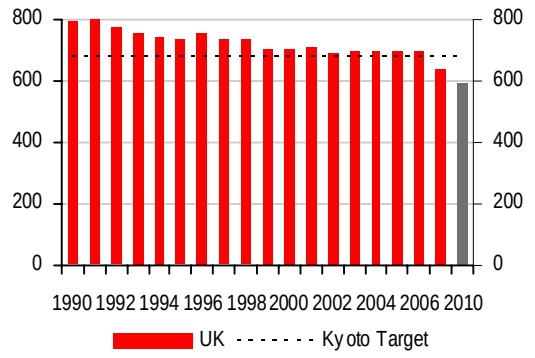
Source: IMF World Economic Outlook Database, October 2008; HSBC estimates

Climate change profile

The UK has a longstanding commitment to climate change and is on track to meet its Kyoto target of a 12.5% cut from 1990 levels by 2008-12. However, it is highly unlikely that it will meet the government's own target of reducing emissions of CO2 by 20% from 1990 levels by 2010.

In November 2008, the UK passed the landmark Climate Change Act, which legally binds the country to cut emissions by 80% by 2050, with an interim target of at least 26% by 2020, against a 1990 baseline. The UK has, however, made far less progress on clean energy, with only 1.6% of its energy mix in 2006 from renewable sources. This has to rise to 15% by 2020, as part of the implementation of the EU's Renewable Energy Directive. Closing this gap will require a significant expansion of renewable electricity (notably from wind) as well as renewable heat (such as bio-gas) along with accelerated energy conservation. The 2008 Energy Act could help to streamline the planning process to enable accelerated construction of low-carbon power sources.

The UK's GHG emissions, 1990-2010 (mtCO2e)



Source: European Environment Agency (EEA), June 2008

Budgeting for a 'low carbon recovery'

The UK government launched its GBP20bn recovery plan as part of the November Pre-Budget report (PBR), equivalent to 1.4% of GDP in 2009e. The package included a modest GBP535m "green stimulus", as well as other environmental spending commitments.

The second round, full Budget 2009, announced in April was far greener than the PBR allocating over GBP1.4bn in addition to previous GBP535mn, which the government estimates will enable an additional GBP10.4bn in low carbon investments from the European Investment Bank and the private sector over the next three years[33]. This takes our estimate of the combined fiscal stimulus for climate and the environment to nearly 11%.

Low-carbon power

At the time of the PBR, the Renewable Obligation was extended from 2027 to 2037, and clean energy received a further boost in the budget with increased banding under the Renewable Obligation Certificate (ROC) regime from 1.5 to 2.0 for new orders placed in 2009-10; this is expected to provide GBP525m in incentives from 2011-2014, but this is not counted as a fiscal stimulus as it does not involve extra government spending.

[33] .*HM Government, Investing in a Low Carbon Britain, 2009*

A Low Carbon Investment Fund worth GBP405mn has been established to give targeted support for sectors with high growth potential; further details are expected when the government finalises it's the low-carbon industrial strategy in the summer.

In addition, two to four Carbon Storage and Capture demonstration projects will get GBP60mn. Crucially, the government also announced that no new coal-fired plants will now be approved without at least partial CCS and the entire plant must be retrofitted five years after CCS is technically and commercially proven. The additional costs of CCS will be financed through a dedicated CCS 'feed-in tariff'. Finally, Combined Heat and Power plants will be exempted from the climate change levy.

Energy efficiency

Energy efficiency emerges as the major focus of the stimulus package.

- *Building efficiency*: The package allocates GBP100m on Warm Front scheme to improve insulation and heating systems. Under the Decent Home programme, GBP60m will be spent to provide the latest energy efficiency measures. Energy-saving technologies will also benefit pro rata from the 2.5% cut in VAT. In addition cGBP365mn has been allocated in the final budget to improve insulation and moving to higher energy efficiency standards over the next two years. Finally, a GBP350m Community Energy Saving Programme is also being launched in 2009.
- Modal shift: GBP300m will be spent to accelerate the delivery of 200 new carriages and GBP5m on British Waterways' network infrastructure.
- Low-carbon vehicles: In January 2009, the government introduced an additional support package for the automotive industry, guaranteeing to unlock loans of up to GBP1.3bn from the EIB – part of the EIB's EUR6bn carbon funding – matched by a further GBP1bn for lower-carbon initiatives. Adding to this the final budget brings forward GBP250mn to promote ultra-low carbon vehicles by giving rebates of USD7500 per vehicle.

Water

The package also addresses adaptation to climate change by spending GBP20m on flood defences.

According to UK government estimates, the "green stimulus" will help to sustain and expand the estimated 350,000 jobs in the low-carbon sector. Adding together the allocation of the PBR and the full Budgets yields a green stimulus of 10.6% of the total outlay of cUSD35bn. Along with these measures, extra 'green taxes' of over GBP2bn will be raised between FY2009-10 and FY2011-12, largely as a result of a tightening of the fuel duty and landfill tax.

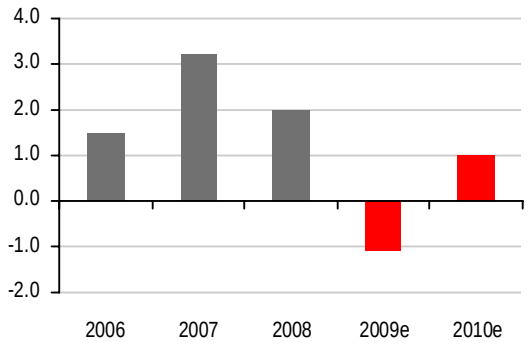
Just as important as the fiscal measures announced was the introduction of the world's first 'carbon budget', setting a legally binding 34% reduction in emissions by 2020 from 1990 levels. The UK is currently on track to meet its Kyoto targets. A detailed plan of action on the 'carbon budget' is due in the summer.

Other Europe: Norway

Economic backdrop

The Norwegian economy slowed in 2008, and a contraction of 1.1% is expected by HSBC this year, with some recovery in 2010.

Norway's real GDP growth (%)



Source: IMF World Economic Outlook Database, HSBC estimates

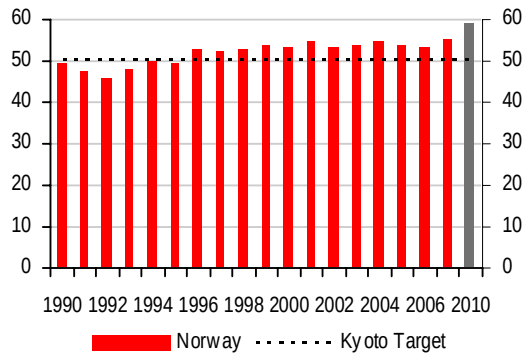
Climate change profile

Norway started taking global warming seriously quite early with the adoption of a CO2-tax in 1991. Today as much as 70% of Norwegian greenhouse gas emissions are covered by economic instruments setting a price on carbon.

The Norwegian Government has made a commitment to overachieve its Kyoto target by 10% corresponding to 9% below the 1990 level. However, the European Environment Agency expects that Norway might overshoot its Kyoto target by 9 mtCO2e, although it could still achieve the target with additional measures.

Norway also intends to go carbon neutral by 2030 through internal reduction measures and offsets. Being a big exporter of oil and gas, Norway is strongly committed to the development of CCS technologies and has decided that all new gas fired power plants will deploy CCS.

Norway's GHG emissions, 1990-2010 (mtCO2e)



Source: Statistics Norway, EEA 2007

A green profile to the recovery

To tackle the global recession, the Norwegian Government amended its 2009 Fiscal Budget with NOK16.75bn of additional spending and an extra NOK3.25bn in targeted tax relief for business sector. Norway is one of the countries adding a substantial green element to its recovery plan, allocating some 30% of the spending. This is an increase by 80% in green spending compared with last year.

Low carbon power

To force the transformation of energy consumption and production towards low carbon, NOK1.2bn has been allocated towards the development of renewable heating solutions. A further NOK75mn would be spent towards wind research and NOK50mn would be used to strengthen the use of bio energy.

To develop the deployment of CCS at the Mongstad power plant, NOK962mn will be allocated as a grant for a test centre and NOK75mn to improve climate research.

Energy efficiency

Environment friendly buildings are promoted with an investment of NOK1.2bn, which is combined with mandating energy consumption standards for new buildings from August 2009.

Modal shift: rail

Rail transportation will be promoted with NOK1.3bn; this will increase fund towards rail to NOK2.6bn more in 2009 than in 2008.

Low-carbon vehicles

Electric transportation gathers significant attention, with an allocation of NOK50mn for the construction of 5000 charging stations for electric cars. Other low carbon modes of transport such cycle route and walkways also gets NOK500mn for development.

HSBC

Europe: summary

In all, we estimate that the EU and its Member States have allocated USD54bn to climate-relevant investment themes. This includes the programmes of the smaller Member States, detailed in the table below.

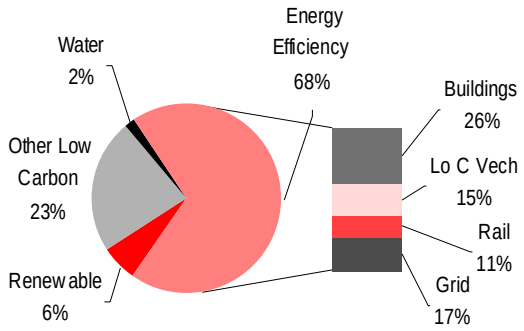
Building efficiency is the most favoured theme, followed by low-carbon vehicles, where a number of countries are directing aid to the struggling auto industry via support for more energy-efficient models. Sweden has also allocated EUR3bn for auto sector R&D to promote low-carbon vehicles.

One surprise is that renewable energy has only been allocated 6% of the climate spend – although this share could increase as general "climate change investment" such as the enhanced EIB lending facility is earmarked for specific projects.

In terms of country rankings, France appears to have allocated the largest share of its stimulus plans to climate themes although Germany has dedicated the largest absolute amount.

The overall consensus in Europe in favour of a 'green new deal' is being challenged, however. A recent study by researchers at Spain's King Juan Carlos University questions whether "green jobs" are worth the public investments. Taking Spain as a case study, the report concludes that the investment in renewable technologies since 2000 has destroyed 2.2 jobs for every "green job" created or 5.28 jobs destroyed for each green MW installed. Set against this is the reality that the unemployment rate in Spain has been steadily decreasing since 2000 from 13.87% to 9.5% in 2008[34]. The current expansion of unemployment rate is mainly due to the ending of the real estate bubble. Also in contrast to the study, Germany's investment in clean energy has doubled the renewable energy jobs to 249,300 in 2007 from 160500 green jobs in 2004[35].

Green investments in EU zone (USD54bn)



Source: HSBC

Green stimulus allocations in other EU zone members (all in EURbn)

Other European States	Total	Low-carbon power	Energy efficiency	Water/waste
Belgium	3.4	-	0.15	-
Denmark	-	-	-	-
Ireland	-	-	-	-
Greece	23.0	-	-	-
Spain	66.6	-	-	-
Netherlands	3.2	-	-	-
Austria	6.4	-	0.16	-
Poland	28.3	1.50	-	-
Sweden	107.6	-	3	-
Total	**238.48**	**1.50**	**3.31**	**-**

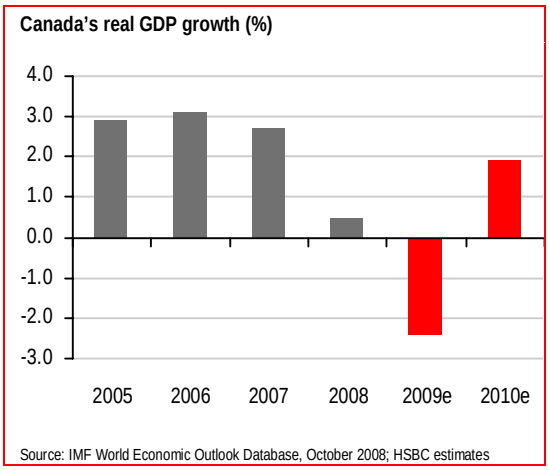
Source: HSBC, Brueghal

[34] *http://indexmundi.com/spain/unemployment_rate.html*
[35] *http://www.renewableenergyworld.com/rea/news/article/2008/04/renewable-energy-jobs-soar-in-germany-52089*

The Americas
Canada

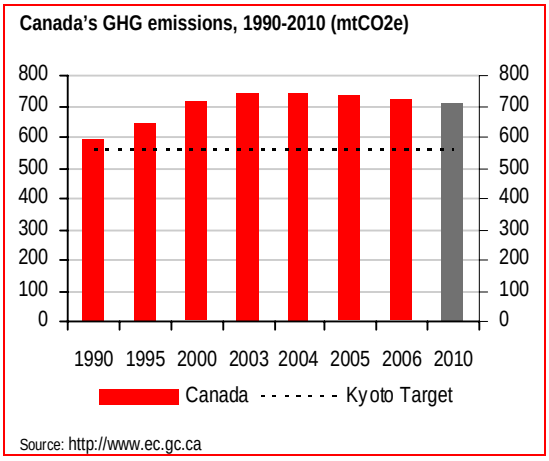
Economic backdrop

Canada's economy has moved in line with its southern neighbour, slowing substantially in the second half of 2008. HSBC expects GDP to fall by -2.4% in 2009 before moving back into positive territory in 2010.



Climate change profile

Canada's resource-based economy and close links with the USA has meant that its GHG emissions are well above its Kyoto target of a 6% reduction in emissions from the 1990 level by 2008-12. In April 2007, the Canadian government announced its "Turning the Corner" climate plan, which introduces a new target of cutting GHGs by 20% by 2020, but from a 2006 baseline. This would translate in to for all covered industrial sectors to reduce their emissions intensity from 2006 levels by 18% by 2010, with a 2% continuous improvement every year thereafter[36]. The system is expected to be up and running from 1 January 2010. Canada also has a suite of renewable energy policies at the federal and provincial levels, such as ecoENERGY, which is similar to the US ITC and PTC.



Budget stimulus

Canada announced its Economic Action Plan along with the 2009 Budget in January. This will provide almost CAD40bn over the next two years, equivalent to c1.5% of GDP in 2009e and c1.1% in 2010e. In 2009 alone, the spending will be CAD30bn, or 1.9% of GDP. The spending will target "shovel-ready" projects that can start in the upcoming construction season, such as roads, bridges, public transit, clean-energy, broadband Internet access, electronic health records, laboratories and border crossings.

Low-carbon power

The plan will invest CAD150m over five years on low-carbon research, of which CAD0.85bn would be invested on CCS demonstration. In addition, Canada will invest CAD351m in Atomic Energy of Canada Limited over two years to finance the Advanced CANDU reactor, making it the only country so far to include nuclear in a stimulus package.

Energy efficiency

To promote energy efficiency in the domestic building sector, the package provides CAD300m over two years under the ecoENERGY Retrofit programme to support c200,000 additional home retrofits. The package also provides CAD1bn over five years for the Green Infrastructure Fund to support the modernisation of energy transmission lines, increasing grid connectivity for renewable

36 *http://www.ec.gc.ca/doc/virage-corner/2008-03/541_eng.htm*

Canada's economic action plan (CADm)			
Stimulus areas	**2009**	**2010**	**Total**
Action to help Canadians and stimulate spending	5,880	6,945	12,825
Action to stimulate housing construction	5,365	2,395	7,760
Housing leverage	*725*	*750*	*1,475*
Immediate action to build infrastructure	6,224	5,605	11,829
Infrastructure leverage	*4,532*	*4,365*	*8,897*
Action to support businesses and communities	5,272	2,255	7,527
Sectoral leverage	*1,300*	-	*1,300*
Total federal stimulus	**22,742**	**17,200**	**39,942**
Total stimulus (with leverage)	**29,298**	**22,316**	**51,613**
As a share of GDP (%)			
Total federal stimulus	1.5	1.1	2.5
Total stimulus (with leverage)	1.9	1.4	3.2

Source: Budget Report 2009

energy as well as the efficient transfer of generated electricity. Finally, CAD0.5bn will be invested over five years to promote inter-city passenger rail.

Water and waste

Over the next two years, CAD165m will be spent on drinking water and waste water infrastructure projects.

According to Canadian government estimates, the Economic Action Plan will generate a leverage of USD9.3bn in investments over the next two years. Moreover, it estimates investments to boost clean energy could leverage at least CAD2.5bn over the next five years. In addition, it believes some 407,000 jobs could be created.[37]

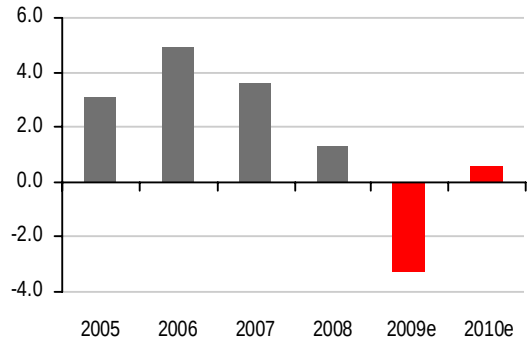
[37] *www.canada.com/topics/news/national/story.html?id=1145083*

Mexico

Economic backdrop

The Mexican economy has been negatively affected more than we had expected six months ago. HSBC expects Mexican GDP to rapidly decelerate registering a negative growth of -3.3% in 2009 followed by a marginal recovery of 0.6% growth in 2010.

Mexico's real GDP growth (%)



Source: IMF World Economic Outlook Database, HSBC estimates

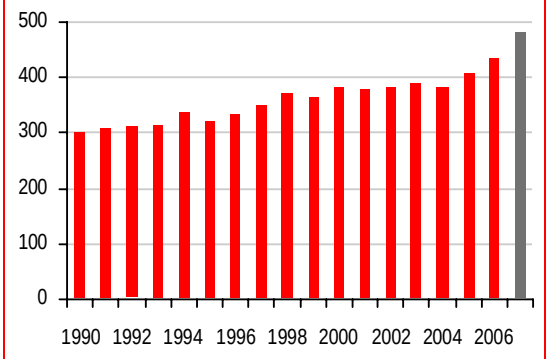
Climate change profile

Latin America's second largest economy, Mexico is the world's twelfth largest CO2 emitter, generating c436mtCO2 annually. As a developing country, Mexico does not have any national commitments under the Kyoto Protocol, but has nevertheless implemented the Mexico GHG Programme which is the first of its kind in an emerging economy.

Mexico has also committed to reduce its GHG emissions by 50% below 2002 levels by 2050 in exchange for technological and financial aid from developed world. Mexico plans to introduce a national multi-sectoral cap-and-trade programme that could be in place by 2012. The nation plans to cut its emissions through the expansion of natural gas cogeneration, the construction of 2,500 MW of wind power, and solar water heating for the commercial and residential sectors.

These measures are expected to reduce emission by 126mtCO2e - 24% of current GHG emissions - by 2014.

Mexico's CO2 emissions, 1990-2010 (mtCO2)



Source: EIA 2008, HSBC

Last year, Mexico passed its energy reform legislation which mandate the production of 25% of its electricity from renewable energy sources in the next four years. The reform would also establish energy efficiency and conservation programmes by creating a national commission on energy efficiency.

Stimulating efficiency

In January 2009, Mexico's President Felipe Calderón announced a National Agreement in Support of Family Finances revealing a fund of PESO118.5bn (USD7.7bn), which is aimed at overcoming the effects of the international economic crisis. The package mostly focuses its spending to support employment and employees and infrastructure projects by state companies. The stimulus translates into 1% of 2008 GDP.

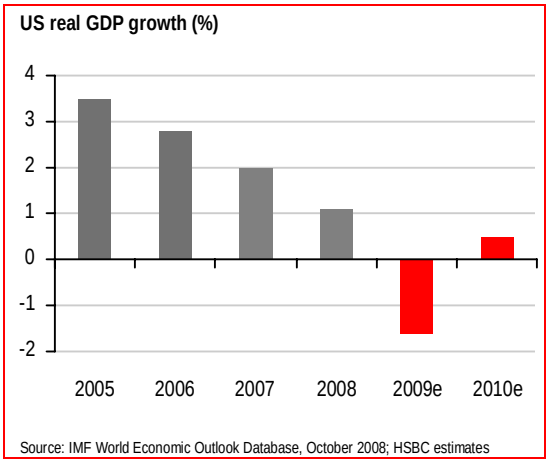
Energy efficiency

The only 'green' spending in the Mexican stimulus is a USD750mn allocation for low incomes families to replace old appliances with more efficient equipment. This green stimulus forms 10% of the total.

USA

Economic backdrop

The fall in US GDP of 3.8% in Q4 2008 was the largest quarterly decline since Q1 1982. We expect the economy should return to positive GDP growth from the second quarter of 2009, boosted by tax cuts and the large government spending increase. However, annual GDP growth for 2009 will still be negative, with moderate expansion in 2010.



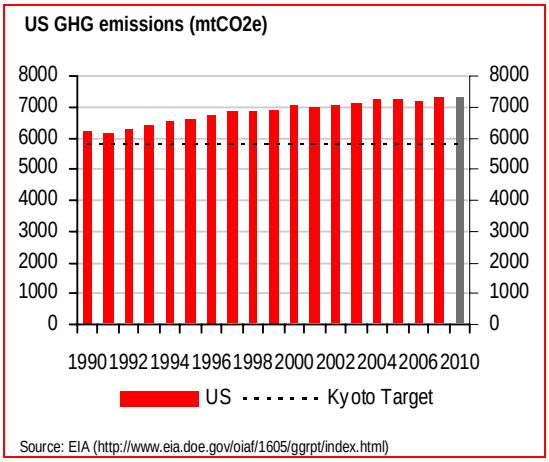
Climate change profile

The US has the largest historical share of global GHGs and retains one of the highest levels of per capita emissions, twice that of the EU and three times the global average. Although the US played an active role in negotiating the Kyoto Protocol, after receiving a target to cut emissions by 7% by 2008-12, the Bush Administration refused to ratify the Protocol, citing competitiveness concerns. The absence of federal-level climate and clean-energy policies has meant that US emissions are well above the Kyoto target.

The new Obama Administration has committed to bringing emissions back to 1990 levels by 2020, en route to an 80% cut by 2050. In addition, it has pledged to spend at least USD150bn over the next decade on clean energy, doubling renewable energy over the next three years, as well as introducing a "cap and trade" system similar to the EU ETS. These commitments were reinforced in the president's budget for 2010, reiterating plans to raise an annual USD80bn through the cap-and-trade programme.

Currently a comprehensive clean energy and climate bill is being negotiated in the House of Representatives. This is designed to introduce a federal renewable portfolio standard of 20% of electricity by 2025, with up to 5% energy efficiency offsets allowed. In addition, there will be further energy efficiency standards. Most focus is on the proposals for cap-and-trade which are likely to get watered down to achieve passage through the House.

Within a week of taking office, President Obama signalled the importance of improving vehicle fuel economy by requesting the Environmental Protection Agency to reconsider its decision to deny California a waiver under the Clean Air Act, which would have enabled California and 17 other states to impose stricter-than-federal limits on automobile GHGs.



Climate change is fully integrated into the new Administration's plans to transform the US energy system. The Administration's priorities include reducing US dependence on imported oil from the Middle East and Venezuela within 10 years, creating at least 5 million "green collar" jobs and stimulating clean-tech innovation. This strategy

was integral to the USD787bn American Recovery and Reinvestment Act (ARRA), signed into law in February, which built on the modest boost to clean energy contained in the Bush Administration's emergency package in October 2008.

Round 1: EESA

In October 2008, US Congress approved the Emergency Economic Stabilization Act, the centrepiece of which was the USD700bn rescue package for the financial sector. Alongside the Troubled Assets Relief Program (TARP), the Act contained USD185bn of tax cuts and credits, including USD18.2bn for clean energy.

At the last moment, the Production Tax Credit (PTC) for wind and the Investment Tax Credit (ITC) for solar were extended to a value of USD9.45bn. In addition, government support of USD2bn was allocated to carbon capture and storage (CCS). Please refer to our 6 October 2008 Flash Note, *'Global Wind and Solar'*, for details.

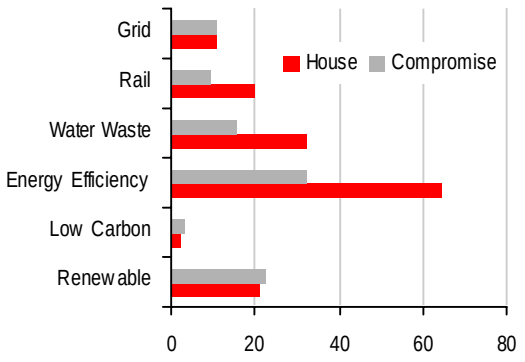
Round 2: ARRA

The American Recovery and Reinvestment Act was originally designed to bring about a USD825bn stimulus package, but this has been slimmed down to ensure passage through both houses of Congress. A number of "green" features were cut as part of this, most notably in measures to boost building efficiency and expand rail infrastructure, reducing the "green" spend from an estimated USD151bn to USD94bn.

The final USD787bn package contains USD295bn in tax cuts for individuals and businesses, along with USD492bn in new spending over the next two years. According to Congressional Budget Office, at least 70% of the money – or more than USD585bn – is expected to be spent in the next 18 months.

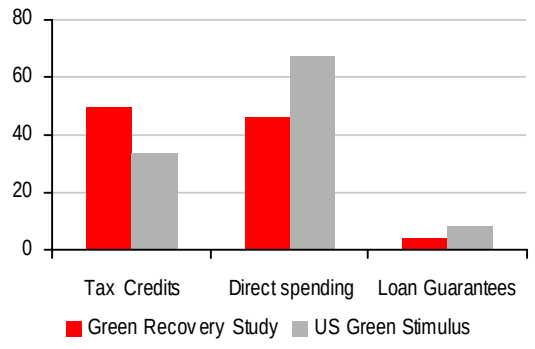
The Obama Administration came into office recognising that the launching of a stimulus package in its first 100 days was its chief priority. From the beginning, clean energy was an integral component, drawing on ideas developed in the run-up to the Presidential election. For example, the influential Center for American Progress published a wide-ranging study in September 2008, setting out a USD100bn Green Recovery programme, focusing on building retrofit, mass transit, smart grids and renewable energy.[38] The same themes also feature in the final ARRA, along with extra investment in water infrastructure.

Green components in House proposal vs final (USDbn)



Source: HSBC

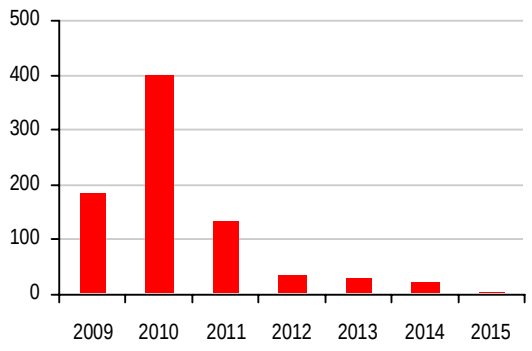
Green recovery study vs US green stimulus (USDbn)



Source: HSBC, Centre for American Progress, September 2008

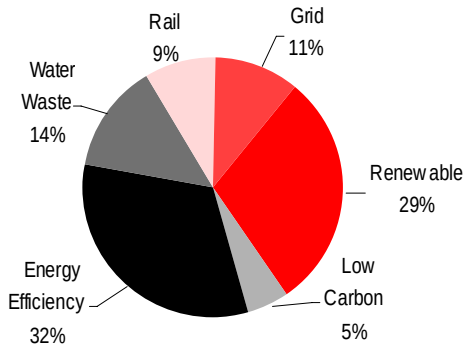
[38] *Center for American Progress, Green Recovery, September 2008*

American recovery plan disbursement schedule (USD787bn)



Source: Congressional Budget Office, February 2009

Green stimulus breakdown (TARP & American Recovery Plan) USD112bn



Source: HSBC

Low-carbon power

- *Renewables:* ARRA provides a better-than-expected boost to the US renewable energy sector. Please refer to our Flash Note '*US Stimulus Package – Implications for Renewables*', 16 February 2008, for detailed commentary. In brief, ARRA extends the PTC for the sectors under TARP (notably wind, biomass and geothermal) for three years, allows developers to swap this for the ITC's 30% capital subsidy during 2009/10 and provides an extension of the 50% bonus depreciation in 2009. Crucially, developers may opt to receive cash grants from the Treasury in lieu of the ITC, benefiting those without sufficient taxable profits to offset. Furthermore, the package provides USD6bn of DoE loan guarantees and introduces a new "build in America" manufacturing ITC, providing a 30% capital subsidy for companies wishing to construct new plant in the US. In all, we estimate that ARRA provides USD22.5bn of incentives for the renewable energy sector.

- *CCS:* ARRA extends America's commitment to carbon capture and storage demonstration projects, with incentives worth USD3.4bn.

Energy efficiency

ARRA allocates unprecedented resources to upgrading the energy efficiency of the US economy, which we estimate at USD52bn for buildings, low-carbon vehicles, modal shift to rails and for modernising the electricity grid.

ARRA will provide USD25bn in finance to enable state and local governments to invest, including building and home energy conservation programmes, energy audits, fuel conservation programmes, building retrofits, along with "smart growth" planning and zoning. It also encourages states to update energy-efficient building codes and regulatory policies to promote demand-side management programmes by energy utilities. Tax credits for energy-efficiency improvements – such as insulation and windows – are increased from 10% to 30%.

A further USD10bn will be spent on mass transit and rail along with USD11bn on grid infrastructure[39]. In terms of low-carbon vehicles, ARRA provides USD2bn for advanced batteries along with USD2bn in credits for plug-in hybrids.

[39] *http://www.speaker.gov/newsroom/legislation?id=0273*

HSBC

Water and waste

The plan proposes to invest USD16bn in environmental restoration, flood protection and navigation infrastructure as well as providing clean, reliable drinking water to rural areas, in the process creating more than 375,000 jobs.

Round 3: A low carb budget

Apart from proposing the USD80bn in auction revenues for clean energy, the 2010 Budget mostly repeats the measures included in the ARRA. An additional USD4.9bn has been allocated to a high-speed rail state grant programme and the EPA's Clean Water State Revolving Funds. We expect the budget to be signed into a law by October.

Impacts and implications

If we combine EESA and ARRA then USD112bn of public incentives are being mobilised for climate change investments, over three times what was spent on these programmes in 2008 or provisionally appropriated for 2009.

Creating green jobs

The original ARRA was also estimated to create 3 million jobs by the end of 2010 with infrastructure (road, rail and water) providing 48%, followed by the IT sector at 30% and the energy sector with 16%.[39] The final compromise could cut the job creation potential by between 430,000 and 538,000.[40]

Research suggests that energy-efficiency improvements and green power investments have lasting employment benefits. While the jobs created by tax cuts and traditional infrastructure investment end once the money is spent, programmes that reduce energy lead to net employment gains well into the future. On average, WRI estimates every USD1bn spend by government would yield 30,100 jobs[41]. The Solar Energy Industries Association (SEIA) estimates that renewable incentives will create 60,000 jobs in 2009 and 110,000 over two years.[42]

Driving green investment

In the renewable energy sector, the World Resource Institute (WRI) estimates that for every USD1bn spending on tax credits[41]would add c1466MW resulting in 30,000MW of additional capacity in the next three years. This would generate USD100bn of private investment, delivering a leverage ratio of 3:1. The renewable power added would be c20% of renewable power generation, which stood at 8.4% of total power generation in 2007. For solar alone, the SEIA projects that the measures could prompt 1GW of new installations in 2009 and 2GW in 2010.

Cutting carbon

We estimate that the renewable and energy-efficiency measures (excluding rail) could avoid 65mt of CO2 emissions, around 1% of total US CO2 emissions in 2007. The World Resources Institute has concluded that the package could produce an annual CO2 emission reduction of 592,600 tons between 2012 and 2020 for every USD1bn, delivering an overall reduction of 50mtCO2. This emission reduction equates to a carbon cost of USD170 per ton if the reductions persist for one decade and USD85 per ton if they persist for two decade, much higher than the prospective cap and trade programme in the US.[41]

40 *http://www.americanprogress.org*

41 *A Green Global Recovery? – WRI , February 2009*

42 *http://seia.org/cs/news_detail?pressrelease.id=345*

HSBC

Timing and delivery

As per the Congressional Budget Office, major portion (c70%) of the green stimulus is expected to be spent over the next four years, with at least USD40bn during 2010-11.

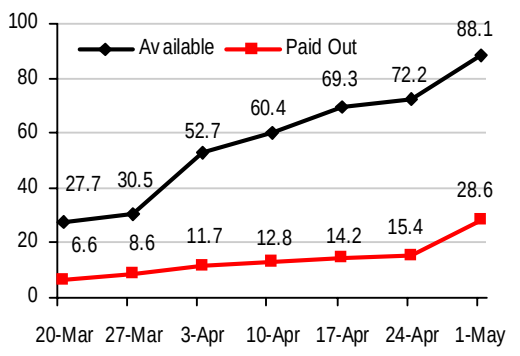
Buy American?

The stimulus bill still retains controversial "buy American" language, mandating the use of US-made iron, steel and manufactured goods. But the provisions appear to have been watered down through the insertion of qualifying language, including a stipulation that it must meet WTO requirements.

Filtering through

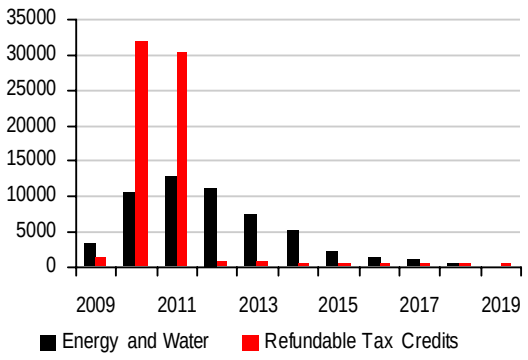
The 'green stimulus' funds under the American Recovery and Reinvestment Act (ARRA) have started to flow. According to the US Department of Energy, recent allocations include USD41.9m to accelerate the commercialization of fuel cells and more than USD3.3bn towards smart-grid technology development grants, with an additional USD615m for smart-grid storage, monitoring and technology viability. This represents just c10% of the money to be deployed in 2009/2010 under the ARRA. However, unlike in China, these announcements have yet to have a macroeconomic effect.

Actual Stimulus disbursement (USDbn) out of USD787bn



Source: Recovery.gov, HSBC

Projected timing of green spending in US stimulus (USDm)



Source: HSBC, Congressional Budget Office, Feb 2009 (American Recovery and Reinvestment Act of 2009)

Looking ahead to the rest of 2009, we expect the American Clean Energy and Security Act (ACESA) to pass through the House this year. However, it is unlikely to receive Senate approval prior to Copenhagen.

Other G2O

India

India has announced two general stimulus packages so far, both with a very limited climate dimension. HSBC estimates the measures to be worth a maximum of INR400bn (0.7% of GDP), of which around INR300bn (0.5% of GDP) will show up in the budget deficit.

One aspect of potential interest is the provision for the Indian Infrastructure Finance Company (IIFCL) to borrow INR300bn (0.6% of GDP) via tax-free bonds. This is three times the amount provided for in the 7 December package. The entire sum would be leveraged to provide about INR1trn of low-cost resources to projects, mainly in ports, roads and railways. Further details are required to identify the potential for boosting mass transit and other rail systems.

Brazil, Russia and Turkey

Other G20 countries such as Brazil, Russia and Turkey have not allocated money towards green spending in their stimulus packages. Brazil has only revealed unemployment insurance benefits and some additional investments in infrastructure, while Russia is spending to save jobs and taxing imported cars to save their auto industry. Turkey's stimulus is mostly focusing on tax cuts for cars and business.

This page is intentionally left blank.

HSBC

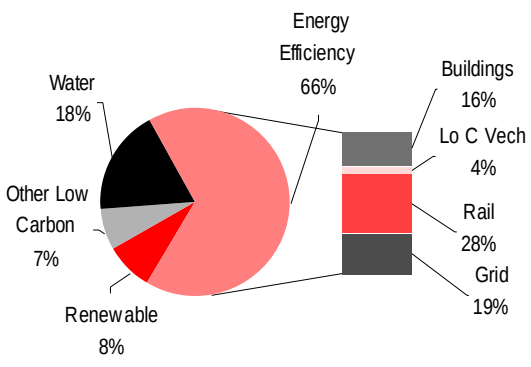
Theme analysis

HSBC

Allocating the stimulus

Across the different economic stimulus plans that we have evaluated, there is considerable variation in the allocations towards different climate change themes. Taken together, a broad energy-efficiency theme emerges with nearly two-thirds of the total, with the largest shares comprised of rail and grid. This is fully in line with the global climate change policy consensus that 'energy efficiency improvements are by far the single most important action until 2020'.[43]

Green stimulus theme allocation (USD478bn)

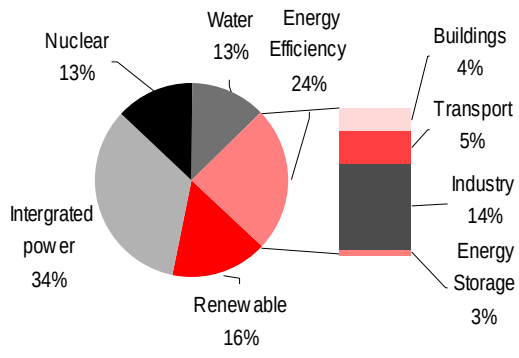


Source: HSBC

The green components of the stimulus packages, by contrast, indicate where government policy wishes to prioritise the future evolution in the climate economy. Significant differences between the two include:

- *Low*-carbon power: there are more renewables in the Index, and considerably more nuclear, than in the stimulus plans.
- Energy efficiency: there is significantly less emphasis on transport efficiency in the Index, largely due to the major allocation to rail in China's revival plan.
- *Water and waste*: there is less emphasis on water and waste in the Index than the stimulus plans.

HSBC Climate Change Index composition



Source: HSBC, as on 6 March 2009

The Grantham Institute at the London School of Economics has published a way of rating the "green stimulus potential" of different options. The LSE team selects five criteria: timeliness, long-term social returns, positive lock-in effects, job-creation potential, focus on economic slack and the extent to which spending is temporary. We have compared allocations to date with this methodology, with some revealing findings:

- *Rail*, which is the largest share of the stimulus, is rated relatively poorly in terms of "green stimulus" potential.
- Building efficiency, which is rated as top in terms of "green stimulus" potential, is third in terms of the amounts spent on low-carbon options, and fourth if water infrastructure is included.
- Renewables, ranked second in terms of "green stimulus" potential, lags in the current recovery plans.

Interestingly, the green priorities of new US ARRA score well against this rating methodology, with building efficiency first, followed by renewables.

The initial findings from this analysis indicate where governments could focus their attention in any subsequent stimulus updates.

[43] *EC, Towards a comprehensive climate change agreement, Commission Working Paper, January 2009*

HSBC

Effectiveness of green stimulus (1 = worst; 3 = best)

Green stimulus areas	Investment approach	Stimulus fund* (USDbn)	Timeliness ("shovel-ready")	Long-term social return	Positive lock-in effects	Domestic multiplier/job creation	Targeting areas with slack	Time-limited/ reversibility	Rank
Buildings efficiency	Mixed public / private	74.6	3	3	2	3	3	3	**1**
Renewables	Private	39.7	2	3	2	2	2	2	**2**
Low-carbon vehicles	Private with incentives	18.4	2	3	3	2	2	2	**3**
Rail	Mixed public / private	132.1	1	3	3	2	2	2	**4**
Other low carbon	Mixed public / private	35.5	2	3	3	3	1	2	**5**
Grid/smart metering	Public with clawback tariffs	91.7	2	3	3	2	1	2	**6**

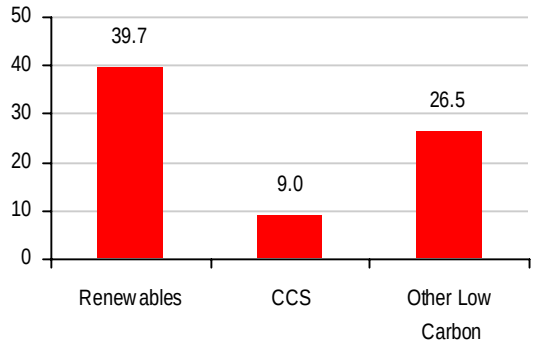
*Under the Green Stimulus we have analysed for 20 countries
Source: An outline of the case for Green Stimulus, Feb 2009; HSBC;

Low-carbon power

Renewables

Just under USD40bn, or 8% of the total 'green stimulus' is allocated to renewable energy. Of this, the USA accounts for USD32bn; USD10bn in last October's EESA and USD22bn in the ARRA.

Low carbon power breakdown (USDbn)



Source: HSBC

CCS and others

CCS pilot and demonstration plants have been assigned USD9bn, a major boost towards commercialisation. Again, the USA contributes the largest share, spending USD3.4bn on R&D and also giving a credit of USD10/tCO2 that is captured.

The EU recovery plan provides EUR1.25bn (USD1.62bn) for five countries to support projects on 11 coal fired plants. Even with this subsidy, there will be still a sizeable economic gap to make CCS projects viable.

In terms of nuclear power, Canada is the only country to date to provide support for nuclear power under its stimulus package.

Energy efficiency

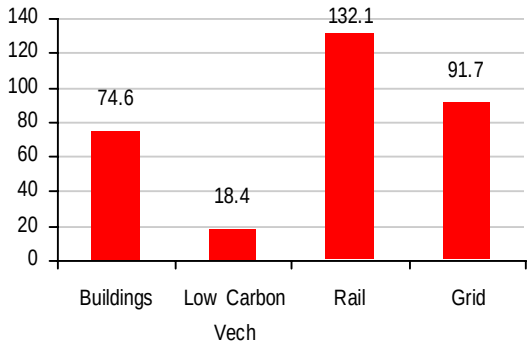
The energy efficiency portion of the stimulus packages has plenty of interesting elements covering a wide range of measures like improving building efficiency, promoting low-carbon vehicles, modal shift along with advanced grid development with smart meters.

The bulk of the energy efficiency spending goes towards infrastructure development on modal shift, towards high-speed rail, as well as grid network development. Grid infrastructure development includes funds to upgrade electricity metering, which will enable users to better control energy costs, and the construction of high-voltage transmission lines to allow for greater renewable energy penetration.

The stimulus packages also provide USD75bn in home energy-efficiency improvement projects, ranging from tax incentives to spending support. The measures include improving insulation, new windows and installing energy-efficient lights in residential dwellings and retrofits in public buildings. The package will help to make a reality of the growing spread of voluntary and mandatory green building norms. Estimates in the USA suggest that every dollar spent on building efficiency yields USD3 in electricity savings.

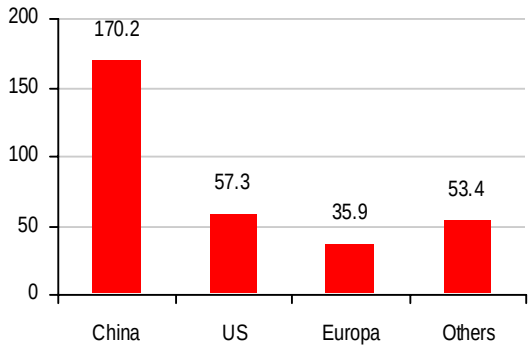
A significant portion is also spend on the development of low-carbon vehicles like hybrid cars or low-carbon emitting fossil fuel vehicles. The fund is mostly spend on R&D for the development of low-weight batteries and plug-in hybrids and as well as "cash for clunker" schemes, giving tax credits or

Energy-efficiency spending sector wise (USD317bn)



Source: HSBC

Energy-efficiency spending country wise (USD317bn)



Source: HSBC

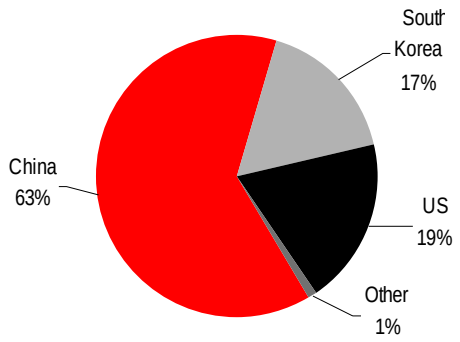
rebates on the purchase of new, low-emitting vehicles. Only France specifies a limit of 160gCO_2/km on new vehicles while Germany specifies a fund for replacement of cars more than nine years old. This is one of the areas where the environmental benefits of the stimulus spending could be weakest unless strict standards are introduced to favour the next generation of high-efficiency vehicles.

Water, waste and pollution control

Our estimates suggest that, so far, USD86.3bn has been committed for the water, waste and pollution control sectors. We have included here the USD30bn that is assigned to general environmental improvement in China, which may well be further reassigned to other themes as implementation progresses and also allocations to housing and rural infra (USD312bn) may have significant investments towards water projects. South Korea and the USA are the other major contributors and account for 19% and 17% of the stimulus respectively.

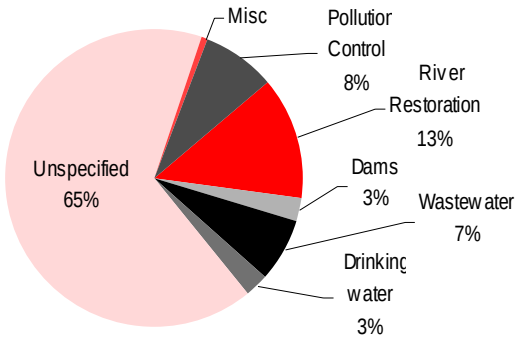
From a climate change perspective, it will be important that these investments promote water conservation, protect natural watersheds and prepare water infrastructure for the impacts of global warming in terms of disrupted precipitation, extreme events and sea-level rises. Expenditure explicitly for pollution control is mainly assigned to defence-related environmental projects in the USA.

Water investments by country (USD86bn)



Source: HSBC

Waste and waste spending by sub-theme (USD86bn)



Source: HSBC

HSBC

A Copenhagen stimulus?

- G20 endorsed a 'sustainable recovery' but found no new money
- Limited progress to date on mobilising finance for action in developing countries as part of a global deal at Copenhagen
- Global climate deal at Copenhagen still remains a question

Global Stimulus

National and regional initiatives to introduce a "green stimulus" cannot be seen in isolation, but as part of a wider set of global negotiations on the route out of economic crisis and the pathway to a low carbon recovery. Positive signs abound, but hard cash has so far been limited for international climate action.

London's pale green G20

The G20 summit held on 2 April in London coincided with the resumption of UN-led climate talks in Bonn, Germany. The G20 leaders focused their attention on launching an USD1.1trn programme of support via the IMF and the international development banks. Following a spate of high-level recommendations[44] to tackle the economic crisis through re-orientating development towards sustainable low-carbon growth, the Leaders' Statement pledged to do 'whatever is necessary' to 'build an inclusive, green and sustainable recovery'. But climate change was relegated to the end of the communiqué, and no new green spending was announced. Nonetheless, the concept of low carbon recovery was endorsed – paving the way for subsequent announcements in Australia, Japan and the UK.

[44] *Towards a Global Green Recovery, March 2009, PIK,Germany*

Will Copenhagen seal the deal?

Finance lies at the heart of the current round of UN negotiations to agree a new climate agreement at Copenhagen this December. New Energy Finance and the World Economic Forum estimate that at least USD515bn needs to be invested annually in clean energy alone over an extended period to drive emissions down to safe levels; last year, investments reached USD155bn.[45]

The Copenhagen conference is designed to reach a comprehensive deal on cutting GHGs, adapting to physical impacts, and providing finance and technology to smooth the transition. From the side of the developing countries, China and the rest of the Group of 77 are arguing that the OECD should allocate 1% of their GDP in additional climate assistance, for reducing emissions and adapting to change. Other countries, such as Mexico and Norway, have focused more on the mechanisms for raising these resources without proposing an amount.

[45] *Copenhagen Climate Council, Catalyzing capital towards the low-carbon economy, 2009*

HSBC

Developed Economies GHG reduction commitments

Country	% Targets by 2020	Base year	Status
Australia	-5 to -25	2000	Officially announced
Belarus	-5 to -10	1990	Under consideration
Canada	-20	2006	Officially announced
European Union	-20 to -30	1990	Adopted by legislation
Japan	+6 to -25	1990	Under consideration
Norway	-30	1990	Adopted by parliament
Switzerland	-20 to -50	1990	Consultations in progress
Ukraine	-20	1990	Under consideration
United States	-20	2005	Under consideration

Source: UNFCCC, HSBC

To get the ball rolling, the European Commission put some of its cards on the table in January. Globally, the EC estimates that EUR175bn in additional annual investments will be needed to drive low-carbon growth by 2020. An earlier draft of the Commission's proposals had suggested that EUR30bn in annual climate assistance would be needed by 2020, with the EU contributing its "fair share" of around EUR12bn per annum. However, the EU summit in March failed to reach agreement on how much finance it would commit, postponing the decision to June. In addition, the United States' welcome return to constructive climate negotiations has not yet been matched with cash. Its submission on the Copenhagen Agreed Outcome recognises the need for a "dramatic increase" in the flow of resources to developing countries, but gives no detail on how much the US will be willing to contribute.

The negotiations in Bonn ended with some technical advances, but little substantive progress in terms of coming closer to a consensus on targets for emission reductions by the industrialised world in a 'son of Kyoto' agreement. Proposals to date from developed economies to reduce their emissions continue to fall below the generally accepted benchmark of a 25-40% cut from 1990 levels by 2020. Taking Australia's recent offer into consideration, the plans outlined by developed nations would add up to average cuts of only 9-16% below 1990 levels by 2020.

Equally, in spite of positive signals from key emerging markets such as Mexico and South Africa, a broader global agreement involving commitments from the developing world remains a long way off – as does clarity over the financial transfers from the industrialised world which will be necessary to win emerging country engagement. While the industrialised world is pressing emerging economies to take on emission curbs, the developing world is insistent that real support is needed to enable them to confront the real and growing costs of a disrupted climate. The Commission on Climate Change and Development, for example, concludes that "adaptation will be very expensive and that costs will rise for decades or centuries".[46] It suggests that in the short-term (2010) spending on adaptation costs will need to be USD6-11bn per year, rising to an USD12-29bn by 2030.

The next set of negotiations in the first half of June will be critical to define the skeleton for a global agreement at Copenhagen, which can then be fleshed out in 2010-2011. The task for policymakers is to design a Copenhagen stimulus, which reaches the parts that the economic recovery plans have so far largely ignored, notably the countries of the developing world.

[46] *Commission on Climate Change and Development, Closing the Gaps, 2009*

A Climate of Recovery? The Green Dimension to Economic A Climate of Recovery? The Green Dimension to Economic Stimulus Plans

Country	Package	Announcement Date	Fund	Fund USD bn	Status	Period Years	Green Fund USD bn	% Green Fund	Low Carbon Power		Energy Efficiency (EE)				Water/ Waste
									Renewable	CCS/Other	Building EE	Lo C Vech+	Rail	Grid	
Asia Pacific															
Australia	Nation Building and Jobs Plan	3-Feb-09	AUD 42 bn	26.7	Passed	2009-2012	2.5	9.3%	-	-	2.48	-	-	-	-
	Budget 2009-2020	12-May-09	AUD 22.5 bn	17.1	Pending	2009-2013	6.8	39.8%	1.40	1.77	0.17	-	3.46	-	-
China	NDRC Stimulus Package	9-Nov-08	RMB 4010 bn	586.1	Passed	2009-2010	200.8	34.3%	-	-	-	1.50	98.65	70.00	30.69
	Budget 2009	6-Mar-09	RMB 420 bn	61.4	Passed	2009	15.6	25.4%	-	-	-	-	4.95	-	10.63
Indonesia	Stimulus Plan	28-Jan-09	IDR 71.3 tn	5.9	Passed	2009	0.1	1.6%	0.07	-	-	-	0.03	-	-
Japan	Pckg to Safeguard People's Daily Lives	19-Dec-08	Yen 43 tn	485.9	Passed	2009 onwards	12.4	2.6%	-	-	12.43	-	-	-	-
	Countermeasures to economic crisis	10-Apr-09	Yen 15.4 tn	154.0	Passed	2009 onwards	23.6	15.3%	1.07	12.93	5.90	3.70	-	-	-
South Korea	Green New Deal	6-Jan-09	USD 38.1 bn	38.1	Passed	2009-2012	30.7	80.5%	1.80	-	6.19	1.80	7.01	-	13.89
Saudi Arabia	Budget 2009	23-Dec-08	SR 475 bn	126.8	Passed	2009	9.5	7.5%	-	-	-	-	-	-	9.45
*Sub-total Asia Pacific**				*1518.9*			*302.0*	*19.9%*	*4.3*	*14.7*	*27.2*	*7.0*	*114.1*	*70.0*	*64.7*
South Africa	Budget 2009-2010	11-Feb-09	R 78.5 bn	7.5	Passed	2009-2011	0.8	10.7%	0.00	0.00	0.10	0.00	0.61	0.00	0.10
Europe															
European Union**	Economic Recovery Plan-Only EU	26-Nov-08	EUR 200 bn	38.8	Passed	2009-2010	24.7	63.7%	0.65	12.49	2.85	3.88	-	4.85	-
Germany	Stimulus Plan	5-Nov-08	EUR 81 bn	104.8	Passed	2009-2010	13.8	13.2%	-	-	10.39	0.69	2.75	-	-
France	Revival Plan	10-Dec-08	EUR 26 bn	33.7	Passed	2009-2010	7.1	21.2%	0.87	-	0.83	-	1.31	4.13	-
Italy	Emergency Package	28-Nov-08	EUR 80 bn	103.5	Passed	2009 onwards	1.3	1.3%	-	-	-	-	1.32	-	-
Spain	Stimulus Package	27-Nov-08	EUR 11 bn	14.2	Passed	2009	0.8	5.8%	-	-	-	-	-	-	0.83
United Kingdom	Budget 2009 with Loan for cars	22-Apr-09	GBP 25.3 bn	34.9	Passed	2009-2011	3.7	10.6%	0.10	0.64	0.79	1.72	0.41	-	0.05
Other EU States	Stimulus Package	Jan-09	EUR160bn	207.1	Passed	2009-2010	1.9	0.9%	0.8	-	0.6	0.3	0.0	-	0.1
Sub-total EU				*537.0*			*53.4*	*9.9%*	*2.4*	*13.1*	*15.5*	*6.6*	*5.8*	*9.0*	*1.0*
Norway	Fiscal Stimulus	26-Jan-09	NOK 20 bn	2.9	Passed	2009	0.9	29.7%	0.2	0.0	0.2	0.0	0.3	-	0.2
Sub-total Europe				*539.9*			*54.3*	*10.1%*	*2.5*	*13.1*	*15.7*	*6.6*	*6.1*	*9.0*	*1.2*
Americas															
Canada	Economic Action Plan	27-Jan-09	CAD 40 bn	31.8	Pending	2009-2013	2.8	8.7%	-	1.08	0.24	-	0.39	0.79	0.27
Mexico	Aggr for Home Economics & Emp	7-Jan-09	PESO 118 bn	7.7	Passed	2009	0.8	9.7%	-	-	0.75	-	-	-	-
United States	Emergency Economic Stabilization Act	3-Oct-08	USD 185 bn	185.0	Passed	10 Years	18.7	10.1%	10.25	2.60	3.34	0.76	0.33	0.92	0.52
	American Recov and Reinvestmt Plan***	15-Jan-09	USD 787 bn	787.0	Passed	10 Years	94.1	12.0%	22.53	3.95	27.40	4.00	9.59	11.00	15.58
	Budget 2010#	Mar-09	USD 4.9 bn	4.9	Pending	2010	4.9	-	-	-	-	-	1.00	-	3.90
Sub-total Americas##				*1024.1*			*121.2*	*11.8%*	*32.8*	*7.6*	*31.7*	*4.8*	*11.3*	*12.7*	*20.3*
Total				**3090**			**478**	**15.5%**	**39.7**	**35.5**	**74.6**	**18.4**	**132.1**	**91.7**	**86.3**

(*Includes Thailand and India stimulus; ** Only EUR30bn from direct EU contribution considered; *** USD700bn under TARP for bank bailouts not considered; # Includes only additional spending ; ## Includes Argentina and Chile stimulus; +Low Carbon Vehicles)
Source: HSBC

Notes

Notes

HSBC

Disclosure appendix

Analyst certification

The following analyst(s), who is(are) primarily responsible for this report, certifies(y) that the opinion(s) on the subject security(ies) or issuer(s) and any other views or forecasts expressed herein accurately reflect their personal view(s) and that no part of their compensation was, is or will be directly or indirectly related to the specific recommendation(s) or views contained in this research report: Nick Robins, Robert Clover and Charanjit Singh

This report is designed for, and should only be utilised by, institutional investors. Furthermore, HSBC believes an investor's decision to make an investment should depend on individual circumstances such as the investor's existing holdings and other considerations.

Analysts are paid in part by reference to the profitability of HSBC which includes investment banking revenues.

For disclosures in respect of any company, please see the most recently published report on that company available at www.hsbcnet.com/research.

** HSBC Legal Entities are listed in the Disclaimer below.*

Additional disclosures

1 This report is dated as at 22 May 2009.
2 All market data included in this report are dated as at close 20 May 2009, unless otherwise indicated in the report.
3 HSBC has procedures in place to identify and manage any potential conflicts of interest that arise in connection with its Research business. HSBC's analysts and its other staff who are involved in the preparation and dissemination of Research operate and have a management reporting line independent of HSBC's Investment Banking business. Chinese Wall procedures are in place between the Investment Banking and Research businesses to ensure that any confidential and/or price sensitive information is handled in an appropriate manner.

HSBC

Disclaimer

** Legal entities as at 22 October 2008*
'UAE' HSBC Bank Middle East Limited, Dubai; 'HK' The Hongkong and Shanghai Banking Corporation Limited, Hong Kong; 'TW' HSBC Securities (Taiwan) Corporation Limited; 'CA' HSBC Securities (Canada) Inc, Toronto; HSBC Bank, Paris branch; HSBC France; 'DE' HSBC Trinkaus & Burkhardt AG, Dusseldorf; 000 HSBC Bank (RR), Moscow; 'IN' HSBC Securities and Capital Markets (India) Private Limited, Mumbai; 'JP' HSBC Securities (Japan) Limited, Tokyo; 'EG' HSBC Securities Egypt S.A.E., Cairo; 'CN' HSBC Investment Bank Asia Limited, Beijing Representative Office; The Hongkong and Shanghai Banking Corporation Limited, Singapore branch; The Hongkong and Shanghai Banking Corporation Limited, Seoul Securities Branch; HSBC Securities (South Africa) (Pty) Ltd, Johannesburg; 'GR' HSBC Pantelakis Securities S.A., Athens; HSBC Bank plc, London, Madrid, Milan, Stockholm, Tel Aviv, 'US' HSBC Securities (USA) Inc, New York; HSBC Yatirim Menkul Degerler A.S., Istanbul; HSBC México, S.A., Institución de Banca Múltiple, Grupo Financiero HSBC, HSBC Bank Brasil S.A. - Banco Múltiplo, HSBC Bank Australia Limited, HSBC Bank Argentina S.A., HSBC Saudi Arabia Limited.

Issuer of report
HSBC Bank plc
8 Canada Square
London, E14 5HQ, United Kingdom
Telephone: +44 20 7991 8888
Fax: +44 20 7992 4880
Website: www.research.hsbc.com

In the UK this document has been issued and approved by HSBC Bank plc ("HSBC") for the information of its Clients (as defined in the Rules of FSA) and those of its affiliates only. It is not intended for Retail Clients in the UK. If this research is received by a customer of an affiliate of HSBC, its provision to the recipient is subject to the terms of business in place between the recipient and such affiliate.

HSBC Securities (USA) Inc. accepts responsibility for the content of this research report prepared by its non-US foreign affiliate. All U.S. persons receiving and/or accessing this report and wishing to effect transactions in any security discussed herein should do so with HSBC Securities (USA) Inc. in the United States and not with its non-US foreign affiliate, the issuer of this report.

In Singapore, this publication is distributed by The Hongkong and Shanghai Banking Corporation Limited, Singapore Branch for the general information of institutional investors or other persons specified in Sections 274 and 304 of the Securities and Futures Act (Chapter 289) ("SFA") and accredited investors and other persons in accordance with the conditions specified in Sections 275 and 305 of the SFA. This publication is not a prospectus as defined in the SFA. It may not be further distributed in whole or in part for any purpose. The Hongkong and Shanghai Banking Corporation Limited Singapore Branch is regulated by the Monetary Authority of Singapore.

In Australia, this publication has been distributed by The Hongkong and Shanghai Banking Corporation Limited (ABN 65 117 925 970, AFSL 301737) for the general information of its "wholesale" customers (as defined in the Corporations Act 2001). Where distributed to retail customers, this research is distributed by HSBC Bank Australia Limited (AFSL No. 232595). These respective entities make no representations that the products or services mentioned in this document are available to persons in Australia or are necessarily suitable for any particular person or appropriate in accordance with local law. No consideration has been given to the particular investment objectives, financial situation or particular needs of any recipient.

This publication has been distributed in Japan by HSBC Securities (Japan) Limited. It may not be further distributed, in whole or in part, for any purpose. In Hong Kong, this document has been distributed by The Hongkong and Shanghai Banking Corporation Limited in the conduct of its Hong Kong regulated business for the information of its institutional and professional customers; it is not intended for and should not be distributed to retail customers in Hong Kong. The Hongkong and Shanghai Banking Corporation Limited makes no representations that the products or services mentioned in this document are available to persons in Hong Kong or are necessarily suitable for any particular person or appropriate in accordance with local law. All inquiries by such recipients must be directed to The Hongkong and Shanghai Banking Corporation Limited.

This document is not and should not be construed as an offer to sell or the solicitation of an offer to purchase or subscribe for any investment. HSBC has based this document on information obtained from sources it believes to be reliable but which it has not independently verified; HSBC makes no guarantee, representation or warranty and accepts no responsibility or liability as to its accuracy or completeness. The opinions contained within the report are based upon publicly available information at the time of publication and are subject to change without notice.

Nothing herein excludes or restricts any duty or liability to a customer which HSBC has under the Financial Services and Markets Act 2000 or under the Rules of FSA. A recipient who chooses to deal with any person who is not a representative of HSBC in the UK will not enjoy the protections afforded by the UK regulatory regime. Past performance is not necessarily a guide to future performance. The value of any investment or income may go down as well as up and you may not get back the full amount invested. Where an investment is denominated in a currency other than the local currency of the recipient of the research report, changes in the exchange rates may have an adverse effect on the value, price or income of that investment. In case of investments for which there is no recognised market it may be difficult for investors to sell their investments or to obtain reliable information about its value or the extent of the risk to which it is exposed.

HSBC Bank plc is registered in England No 14259, is authorised and regulated by the Financial Services Authority and is a member of the London Stock Exchange.

© Copyright. HSBC Bank plc 2009, ALL RIGHTS RESERVED. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, on any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of HSBC Bank plc. MICA (P) 258/09/2008

[236678]

HSBC

Global Alternative Energy & Climate Change Research Team

HSBC Climate Change Indices

Joaquim de Lima
Global Head of Equity Quantitative Research
+44 20 7991 6836 joaquim.delima@hsbcib.com

Vijay Sumon
+44 20 7991 6839 vijay.sumon@hsbcib.com

Freddie Siu
+852 2996 6558 freddiesiu@hsbc.com.hk

Alternative Energy

Robert Clover
Global Sector Head, Alternative Energy
+44 20 7991 6741 robert.clover@hsbcib.com

James Magness
+44 20 7991 3464 james.magness@hsbcib.com

Charanjit Singh
+91 80 3001 3776 charanjit2singh@hsbc.co.in

Christine Wang
+8862 8725 6024 christineccwang@hsbc.com.tw

Burkhard Weiss
+49 211 910 3722 burkhard.weiss@hsbc.de

Christian Rath
+49 211 910 3049 christian.rath@hsbc.de

Murielle André-Pinard
+33 1 56 52 43 16 murielle.andre.pinard@hsbc.com

Vangelis Karanikas
+30 210 6965 211 vangelis.karanikas@hsbc.com

Pedro Herrera
+1 212 525 5126 pedro.herrera@us.hsbc.com

Climate Change Centre of Excellence

Nick Robins
+44 20 799 16778 nick.robins@hsbc.com

Roshan F Padamadan, CFA
+44 207 991 6715 roshanpf@hsbc.com

Credit Research

Madeleine King. CFA
+44 20 7991 6789 madeleine.king@hsbcib.com

Utilities

Verity Mitchell
+44 20 7991 6840 verity.mitchell@hsbcib.com

Nick Robins*
Analyst
HSBC Bank plc
+44 20 7991 6778
nick.robins@hsbc.com

Nick Robins, head of the HSBC Climate Change Centre of Excellence, joined the bank in 2007. He has extensive experience in the policy, business and investment dimensions of climate change and sustainable development.

Robert Clover*
Analyst
HSBC Bank plc
+44 20 7991 6741
robert.clover@hsbcib.com

Robert Clover is the Global Head of Alternative and Renewable Energy Equity Research and he joined HSBC in 2004. Throughout his career he has been ranked in Extel, II and Greenwich. He has an MA (Hons) from Oxford in Classics and Modern languages, is ACCA-qualified and has worked as an investment analyst since 1995.

Charanjit Singh*
Analyst
HSBC Bank plc
+91 80 3001 3776
charanjit2singh@hsbc.co.in

Charanjit Singh joined HSBC in 2006 and is a part of the Alternative Energy team and Climate Change Centre of Excellence. He has been working as a financial and policy analyst since 2000 and also has four years of experience in project management and appraisal. Charanjit holds a Bachelor's degree in engineering and a Master's degree in management.

*Employed by a non-US affiliate of HSBC Securities (USA) Inc, and is not registered/qualified pursuant to NYSE and/or NASD regulations.

HSBC
Global Research